



Ministry of Health & Family Welfare  
Government of India



# NATIONAL ACTION PLAN FOR DOG MEDIATED RABIES ELIMINATION FROM INDIA BY 2030



Government of India  
National Centre for Disease Control  
Directorate General of Health Services  
Ministry of Health and Family Welfare







NATIONAL ACTION PLAN FOR  
**DOG MEDIATED  
RABIES  
ELIMINATION  
FROM INDIA  
BY 2030**







# ACKNOWLEDGMENT

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The “National Action Plan for Dog Mediated Rabies Elimination from India by 2030” is the end product of the collective efforts of implementing agencies and partners who contribute to the prevention, control, and eventual elimination of Rabies from India. The action plan has been developed after series of meetings and deliberations with State, National, and international experts.

We express our extreme gratitude towards our Hon’ble Union Minister of Health and Family Welfare and Ministry of Chemicals and Fertilizers Sh. Mansukh Mandaviya Ji, Hon’ble Union Minister of Fisheries, Animal Husbandry and Dairying, Shri. Parshottam Rupala and Hon’ble Minister of State, Dr Bharati Pawar, and Hon’ble Minister of State of Fisheries, Animal Husbandry and Dairying, Dr. Sanjeev Kumar Balyan who's farsightedness and overall leadership and guidance had set the environment for realizing the goal of Rabies free India by “One Health Approach”.

We express our sincere gratitude to Shri Rajesh Bhushan, Secretary Health and Family Welfare GoI; Dr. Sunil Kumar, Director General Health Services (DGHS), GoI; Ms. Arti Ahuja, Additional Secretary (Health) , MoHFW, GoI; Ms. Vandana Gurnani, Additional Secretary & Mission Director, National Health Mission (NHM), MoHFW, GoI; Shri Vikas Sheel, Additional Secretary (Policy) , MoHFW, GoI; Dr V G Somani, Drug Controller General of India (DCGI), DGHS, GoI; Shri Lav Aggarwal, Joint Secretary, MoHFW, GoI and Shri Govind Jaiswal Director MoHFW , GoI for providing leadership, encouragement and support to the core team as they developed the plan for India.

We are grateful for the support received from Dr. Mala Chhabra, Sr. Consultant Microbiology, Dr RML Hospital New Delhi, Dr Reeta Mani, Addl. Prof NIMHANS, State Nodal Officers of NRCP and all the medical officers of Anti Rabies clinics and Infectious diseases hospitals.

To set a true ‘One Health’ example we are thankful to Department of Animal Husbandry and Dairying, MoFAHD, especially Dr Praveen Malik, Animal Husbandry Commissioner, MoFAH&D, Shri Upmanyu Basu, Joint Secretary, MoAHD, Dr. O.P. Chaudhary, Chairman, Animal Welfare Board of India, Dr. Sujit Kumar Dutta, Secretary & Appellate Authority, AWBI, Dr. Debalina Mitra, Assistant Commissioner, DAHD, MoFAH&D, Dr Aruna Sharma, Assistant Commissioner, DAHD, MoFAH&D, Dr. Vijay Kumar Teotia, Regional Officer, DAHD, GoI. Our constant partners from MoAFW, Indian Council of Agricultural Research, Dr B.N. Tripathi, Deputy Director General (Animal Science), ICAR, GoI, Dr. Ashok Kumar, Assistant Director General (Animal Health), ICAR, GoI, Dr Jyoti Misri, Principal Scientist, ICAR, MoAFW GoI.

From our partner stakeholder we are grateful for the comments from Dr. Renu Swarup, Secretary, DBT, MoST, GoI, Colonel (Dr) K Venkat Narayan, OSD, National Institute for Transforming India, NITI Aayog, GoI, Smt. Malti Rawat, Deputy Secretary, Ministry of Panchayati Raj for guiding us in organization and planning of the NAPRE.

We thank our international partners, Dr Gyanendra Gongal, Regional Advisor- Food Safety, SEARO WHO and Dr Ritu Chauhan NPO IHR at WHO India, Dr. Kinzang Dupka, Regional Project Coordinator, World Health Organization (OIE) Regional Representation for Asia and the Pacific, Tokyo for the technical guidance throughout this endeavor. We are thankful for the SARE workshop organized by DAHD and Dr Terence Scott (GARC) in 2019 which paved a way towards conceptualization of this NAPRE document.

We would like to acknowledge the valuable contribution of prominent experts from our stakeholders and partners who have actively contributed to bring out this guidance documents viz “Department of Animal Husbandry, Dairying & Fishery, Department of Panchayati Raj Institutions, Indian Council of Agriculture Research, Central Zoo Authority of India, Department of Biotechnology, NITI Aayog, NHRC, CRI Kasauli, Municipal corporation of Delhi & Bangalore, Animal Welfare Board of India, Non-Governmental Organization, APCRI, CARCON, GADVASU, TANUVASU, KVAFSU, Kerala State Animal Husbandry Dept and Sikkim State Animal Husbandry Dept , our Regional coordinators under NOHP-PCZ program and Community Participants. In addition to all we are grateful for Dr

Veena Mittal, former Additional Director and Head and Dr U.V.S Rana Former Joint Director of Division of Zoonoses NCDC for paving a path for rabies control efforts and NRCP program.

Overall coordination for developing this document was done by the team of Division of Zoonotic Diseases Control Program NCDC which is led by Dr Simmi Tiwari, Joint Director and Head, Dr. Ajit Shewale, Deputy Director, Dr. Tushar N Nale, Deputy Director, Dr. Monal Daptardar, our Veterinary & Public Health Consultant, Dr. Dipti Mishra, Consultant, Ms. Trishala Sharma, Data Manager, Mr. Mukesh Kumar Saxena, Consultant, NRCP and the support staff members.

Last but not the least we express our extreme gratitude to Dr. Sujeet Kumar Singh, Director National Centre for Disease Control, for providing a dynamic leadership, continued encouragement and support to the core team as they developed the plan for Rabies free India by 'One Health Approach'.

मनसुख मांडविया  
MANSUKH MANDAVIYA



स्वास्थ्य एवं परिवार कल्याण  
व रसायन एवं उर्वरक मंत्री  
भारत सरकार  
Minister for Health & Family Welfare  
and Chemicals & Fertilizers  
Government of India



### MESSAGE

Ministry of Health & Family Welfare reaffirms that the roadmap for "National Action Plan for Dog mediated Rabies Elimination" (NAPRE) from India has its strategic priorities aligned with the Global call for elimination of Dog Mediated Rabies by 2030. This Ministry urges to all stakeholders, States and UT Governments to join hands with us and built towards a commitment for making India Rabies free by participating in all the progressive endeavours.

(Mansukh Mandaviya)

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परशोत्तम रूपाला  
PARSHOTTAM RUPALA



मंत्री  
मत्स्यपालन, पशुपालन एवं डेयरी  
भारत सरकार  
MINISTER  
FISHERIES, ANIMAL HUSBANDRY & DAIRYING  
GOVERNMENT OF INDIA

D.O. No. ....MIN(FAH&D)/2021-22



Ministry of Fisheries, Animal Husbandry and Dairying Reassures to provide all technical support to the State Governments for developing and implementing the state action plans for Rabies elimination based on National Action Plan for (dog-mediated) Rabies Elimination from India by 2030 by a One Health vision through strengthening surveillance, monitoring and regulatory frameworks.

(Parshottam Rupala)

Union Minister for Fisheries, Animal Husbandry and Dairying

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पर्यावरण, वन एवं जलवायु परिवर्तन  
और  
श्रम एवं रोज़गार  
भारत सरकार



MINISTER  
ENVIRONMENT, FOREST AND CLIMATE CHANGE  
AND  
LABOUR AND EMPLOYMENT  
GOVERNMENT OF INDIA

भूपेन्द्र यादव

**BHUPENDER YADAV**



### MESSAGE

Rabies is one of the most fatal zoonotic diseases in the world. 96% of the mortality and morbidity in rabies cases is associated with dog bites. In India, dogs play an important role in rabies transmission, however Rabies in wild animals is equally important for the transmission and maintenance of Rabies in animals.

The Ministry of Environment, Forest, and Climate Change recognizes that Rabies is a public health concern, as well as important concern in the conservation and protection of wild animals and needs the highest priority in the nation.

Since Wildlife Rabies is an important component in the *National Action for Dog-mediated Rabies Elimination from India (NAPRE) by 2030*, the Ministry of Environment, Forest and Climate Change assures its full support to the State Governments and other stakeholders for the efforts required to operationalize the Action Plan as part of the "One Health" approach adopted by the Government of India.

Like other successful elimination programs that the Government has taken up in the past, I hope that this endeavor will also have a similarly successful impact on public health of the country.

With best wishes.

Date: 23.09.2021

(Bhupender Yadav)





हरदीप एस पुरी  
HARDEEP S PURI



आवासन और शहरी कार्य मंत्री  
पेट्रोलियम एवं प्राकृतिक गैस मंत्री  
भारत सरकार  
Minister of  
Housing and Urban Affairs; and  
Petroleum and Natural Gas  
Government of India

### Message

Rabies is one of the most fatal zoonotic diseases in the world. 96% of the mortality and morbidity in rabies cases is associated with dog bites. The Ministry of Housing and Urban Affairs recognises that dog-mediated rabies is a public health concern, and understands that its prevention and control are important public health priorities for the nation. To achieve this, strong inter-sectoral coordination and concerted efforts will be needed among stakeholders at all levels.

In that regard, the Ministry of Housing and Urban Affairs assures its full support to the State Governments and other stakeholders for the efforts required to operationalise the National Action for Dog-mediated Rabies Elimination from India (NAPRE) by 2030 as part of the "One Health" approach adopted by the Government of India.

Like other successful health initiatives and vaccination/immunisation drives that the Government has taken up in the past, I hope that this endeavour will also have a similarly successful impact on public health and consciousness in the country.

  
(Hardeep S Puri)

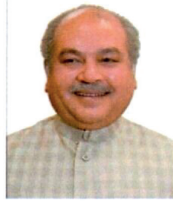
New Delhi  
20 September, 2021



नरेन्द्र सिंह तोमर  
NARENDRA SINGH TOMAR



कृषि एवं किसान कल्याण मंत्री  
भारत सरकार  
कृषि भवन, नई दिल्ली  
MINISTER OF AGRICULTURE & FARMERS WELFARE  
GOVERNMENT OF INDIA  
KRISHI BHAWAN, NEW DELHI



**Inter- Ministerial 'One Health' Declaration for Elimination of Dog mediated Rabies from India by 2030**

Rabies is a viral zoonotic disease that causes progressive and fatal inflammation of the brain and spinal cord. Rabies kills tens of thousands of people every year. Of these cases, approximately 99% are acquired from the bite of an infected dog. Ministry of Agriculture & Farmers Welfare recognizes Dog-mediated human Rabies as Public Health priority requiring urgent mitigating efforts at every level in a coordinated and effective manner.

Ministry of Agriculture & Farmers Welfare assures its full support and cooperation in eliminating Rabies in India through 'One Health' initiative with the understanding that safe public health is a common goal for humans and animals.

(Narendra Singh Tomar)

Date: 22.09.2021



गिरिराज सिंह  
GIRIRAJ SINGH



ग्रामीण विकास तथा पंचायती राज मंत्री  
भारत सरकार  
कृषि भवन, नई दिल्ली  
MINISTER OF  
RURAL DEVELOPMENT AND PANCHAYATI RAJ  
GOVERNMENT OF INDIA  
KRISHI BHAWAN, NEW DELHI



### संदेश

पंचायती राज मंत्रालय रेबीज की रोकथाम और नियंत्रण के लिए ग्राम स्तर पर सुसंगत, व्यापक और एकीकृत बहुक्षेत्रीय कार्यवाही की आवश्यकता को समझता है और यह मंत्रालय पंचायती राज संस्थानों के माध्यम से हमारे देश से वर्ष 2030 तक रेबीज को पूर्ण रूप से खत्म करने हेतु किए जा रहे प्रयासों में सभी हितधारकों को सामूहिक रूप से समर्थन देने का आश्वासन देता है।

(गिरिराज सिंह)





राजेश भूषण, आईएएस  
सचिव

**RAJESH BHUSHAN, IAS**  
SECRETARY



भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण विभाग  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
Government of India  
Department of Health and Family Welfare  
Ministry of Health and Family Welfare



### MESSAGE

Rabies is one of the most important Zoonotic disease affecting both animals and humans. It is estimated to cause an approximate 59,000 human deaths annually in the world. Human rabies can be prevented through prompt administration of Post-Exposure Prophylaxis (PEP) to victims of rabid animal bites and infection can be eliminated at source through sustained mass vaccination of dog population.

It is extremely important to control the disease at the source and prevent establishment of endemicity in the country. As part of the global effort to eliminate the disease by 2030, India is also actively implementing various strategies to control and eliminate dog mediated rabies in the country through a graded approach.

To address the issue of Rabies in India "National Action Plan for Dog Mediated Rabies Elimination from India by 2030" has been developed under National Rabies Control Programme (NRCP). It aims to provide a strategic framework for stakeholders for the reduction of Rabies in India so as to achieve the Global Target of Zero Rabies by year 2030 in India. The strategy describes an integrated 'One Health' approach that brings together the necessary socio-cultural, technical, organizational and political pillars to address this challenge.

I would like to extend my appreciation to all professionals who have contributed towards producing this important national plan document. I am confident that this document will contribute in bringing down the incidence of rabies in the country thereby contributing towards diseasefree life of our citizens.

Place : New Delhi  
Date : 07-09-2021

**(Rajesh Bhushan)**





अतुल चतुर्वेदी, भा.प्र.से.  
Atul Chaturvedi, IAS

सचिव  
SECRETARY



सत्यमेव जयते

भारत सरकार  
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय  
पशुपालन एवं डेयरी विभाग  
कृषि भवन, नई दिल्ली-110001  
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Ministry of Fisheries, Animal Husbandry & Dairying  
Department of Animal Husbandry & Dairying  
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### MESSAGE

Rabies infection causes tens of thousands of deaths every year globally, not only in human, but also in livestock sector. Major health organizations including the OIE, WHO and FAO have collectively pledged to eliminate human deaths from dog-transmitted rabies by 2030 and formed a country-centric, multi-stakeholder collaboration "United Against Rabies" to drive progress towards "Zero human deaths from dog-mediated rabies by 2030".

This herculean task needs a strong commitment to cooperate among public and private partners and the communities at all levels. The Department of Animal Husbandry & Dairying, together with National Rabies Control Programme, National Centre for Disease Control, Ministry of Health & Family Welfare, Government of India and our partners and allies are determined, more than ever to eradicate the disease in animals and avert mortality in humans.

The 'National Action Plan for Dog Mediated Rabies Elimination from India by 2030' (NAPRE) presents appropriate, practical and easy to understand guidelines to plan elimination of Rabies in stepwise approach. While the manual offers clinical guidelines, information and suggested strategies within reach, the bigger challenge is to ensure that service providers, program managers and all concerned partners sustain and adhere to the recommended steps.

I am sure that this document will act as the stepping stone for achieving the dream of rabies free India. I sincerely acknowledge the efforts of all resource persons whose hard work made this possible.

Secretary, DAHD





भारत सरकार  
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GOVERNMENT OF INDIA  
MINISTRY OF HEALTH & FAMILY WELFARE  
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आरती आहूजा, भा.प्र.से.

अपर सचिव

**Arti Ahuja, IAS**

**Additional Secretary**

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MESSAGE



Rabies is a viral zoonotic disease that causes progressive and fatal inflammation of the brain and spinal cord. Although fatal once clinical signs appear, rabies is entirely avoidable; vaccines, medicines and technologies have long been available to prevent death from rabies. Nevertheless, rabies still kills tens of thousands of people each year. Of these cases, approximately 99% are acquired from the bite of an infected dog. As per available information, India accounts for approximately 33% of the global Rabies deaths and almost 67% of the Rabies deaths in Asia annually.

Ministry of Health and Family Welfare, through its National Rabies Control Programme (NRCP) launched under the 12<sup>th</sup> FYP, has streamlined the national and state-level response to Rabies elimination in India. The activities undertaken as part of the Programme include focused training and capacity building, surveillance, laboratory strengthening and advocacy.

I am pleased to share that in line with the global drive to reduce human deaths due to Rabies to Zero by 2030, this “*National Action Plan for Dog Mediated Rabies Elimination from India by 2030*” has been developed by the National Centre for Disease Control (NCDC). This document has been developed after consultation with a wide range of stakeholders and recognizes the interconnection between people, animals, plants, and their shared environment which form the basis of the ‘One Health Approach’. Recommendations of various international agencies such as World Health Organization (WHO), World Organization for Animal Health (OIE), and Global Alliance of Rabies Control (GARC) have also been incorporated in the document.

The National Action Plan document describes the multi-pronged strategies of Prevention, Promotion and Partnership that need to be efficiently implemented in conjunction with various core Ministries, supporting Ministries and private partners in order to eliminate rabies infection. This requires synchronized support from the State and District Programme Management Units (PMUs). The document will also help the PMUs in formulating targeted action plans for elimination of human rabies transmitted by dogs with activities focusing on strengthening both the animal health and human health components of rabies elimination in India.

I congratulate the National Centre for Disease Control and commend the dedicated efforts of the Division of Zoonosis Disease Programme at NCDC for bringing out this crucial guidance document.

I am confident that this National Action Plan will provide a fillip to our Rabies response activities and will enable scaling up of efforts to progressively reduce and ultimately eliminate human rabies in India.

(Arti Ahuja)

Additional Secretary to the Government of India





**विकास शील**  
अपर सचिव  
**VIKAS SHEEL**  
Additional Secretary



भारत सरकार  
स्वास्थ्य एवं परिवार कल्याण मंत्रालय  
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**Government of India**  
**Ministry of Health & Family Welfare**  
**Nirman Bhavan, New Delhi - 110011**

#### MESSAGE

Rabies is a vaccine-preventable viral disease which occurs in more than 150 countries and territories. Dogs are the main source of human rabies deaths, contributing up to 99% of all rabies transmissions to humans. In India burden of Human Rabies is high, necessitating focus on prevention and control activities to mitigate morbidity and mortality due to Human Rabies

Ministry of Health & Family Welfare has launched National Rabies Control Program with aim to prevent Human Deaths caused by Rabies. The National Action Plan for the Elimination of Dog-Mediated Rabies is a comprehensive strategy and program which aims to achieve the goal of Zero by 2030. It has been formulated in consultation with all the stakeholder groups and includes various strategies and activities which will be necessary to achieve this goal.

National health Mission through its Program Implementation Plan providing funds to States & UTs for uninterrupted supply of Rabies Vaccine and immunoglobulin through National Free Drug Initiative. Funds for key strategies like IEC, strengthening surveillance, capacity building, establishment of Model Anti rabies Clinics are being implemented through NHM.

I am confident this action plan will help the State/UTs to plan and implement targetted & cost-effective strategies for Rabies Control.

**(Vikas Sheel)**  
**Additional Secretary and Mission Director**





**डॉ. प्रवीण मलिक**  
**Dr. Praveen Malik**

पशुपालन आयुक्त  
**Animal Husbandry Commissioner**  
Tel.: 23384146



**MESSAGE**

भारत सरकार  
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय  
पशुपालन एवं डेयरी विभाग  
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Government of India  
Ministry of Fisheries, Animal Husbandry & Dairying  
Department of Animal Husbandry and Dairying  
Krishi Bhawan, New Delhi-110001

Dated: 14<sup>th</sup> September, 2021

Rabies is a highly fatal viral zoonotic disease that affects central nervous system of humans and other mammals. In 95% cases, bite of an infected dog is responsible for transmission of rabies to humans, and hence controlling rabies in human can be achieved successfully by controlling animal rabies. Animal Rabies is a notifiable disease in India as per 'The Prevention and Control of Infectious & Contagious Diseases in Animals Act, 2009', which empowers the State authorities to adopt strict measures towards controlling the disease.

As part of the global effort to eliminate dog mediated Rabies by 2030, the Department of Animal Husbandry & Dairying and the National Rabies Control Programme, National Centre for Disease Control under the aegis of Ministry of Health & Family Welfare, Government of India in consultation with other stakeholders has collaboratively framed the 'National Action Plan for Dog Mediated Rabies Elimination from India by 2030 (NAPRE)'. This document has identified strategies to control and eliminate dog mediated rabies in the country through stepwise approach. This document clearly outlines steps and activities to achieve Rabies free areas.

In 2020, the 'KVAFSU-CVA Rabies Diagnostic Laboratory', Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU) has been recognized as Reference Laboratory for Rabies by World Organization for Animal Health (OIE). Besides this, India has 13 more animal rabies diagnostic laboratories which can undertake the important role of rabies diagnosis and support the efforts of the Department for surveillance of disease.

I hope this document will be useful as ready reference to States in framing their State specific action plans for prevention and control of rabies. I am confident that this plan document will directly contribute in bringing down the incidence of both human and animal rabies in the country. I would like to extend my appreciation to all individuals and institutions who have contributed towards framing this important document for excellent coordination.

  
(Praveen Malik)







**LAV AGARWAL, IAS**  
Joint Secretary

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**MESSAGE**

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GOVERNMENT OF INDIA  
MINISTRY OF HEALTH & FAMILY WELFARE  
NIRMAN BHAVAN, NEW DELHI - 110011

The Ministry of Health & Family Welfare remains unwavering in its commitment to secure health for all. Towards this end, tangible initiatives have been taken by the National Centre for Disease Control to prevent deaths due to Rabies in Humans, provide treatment and care and thereby ensure the right to health.

Rabies, a neglected zoonotic disease has been killing an estimated 20000 people annually in India. This is a fatal disease but hundred percent preventable by timely and appropriate post-exposure treatment. National Rabies Control Programme (NRCP) envisages that all Animal Bite Victims receive Anti-Rabies Vaccine and Serums as per their need in all government health facilities.

To eliminate Rabies from India, there is a need for coordinated actions for eliminating Human Rabies transmitted by dogs from all relevant stakeholders especially veterinary and Wild life sector. National Centre for Disease Control as nodal agency for coordinating the Rabies elimination programme envisages long-standing solidarity among the stakeholders for supporting the goal of eliminating human Rabies transmitted by dog from the country.

It is the strategy of health sector that Rabies programme will ensure quality management of animal bite cases, standardized recording & reporting system, availability of Rabies diagnostic facility and intensified community awareness activities in systematic manner in coordination with relaxant stakeholders as per National Action Plan.

We are grateful to all resource persons who worked hard in developing this document and I sincerely hope that this strategic Plan will help in better decision making, planning, implementation, monitoring and evaluation of Rabies control activity in human as well as animal health sectors.

(LAV AGARWAL)



उपमन्यु बसु  
संयुक्त सचिव  
**UPAMANYU BASU**  
Joint Secretary



भारत सरकार  
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय  
पशुपालन एवं डेयरी विभाग  
कृषि भवन, नई दिल्ली-110001  
Government of India  
Ministry of Fisheries, Animal Husbandry & Dairying  
Department of Animal Husbandry and Dairying  
Krishi Bhawan, New Delhi-110001

## Message

Rabies continues to kill tens of thousands of people and animals every year in low and middle-income countries, despite being an entirely vaccine-preventable disease. It is unacceptable that as we advance into the 21st century Rabies is still a threat to humans and animals alike. Public health interventions that focus solely on disease prevention in humans have hardly any effect on reduction of infection in the reservoir hosts.

The primary tools for reaching the target of 'Zero Rabies Death by 2030' are mass vaccination of dogs to interrupt rabies transmission in domestic dog populations that maintain infection, appropriate post-exposure prophylaxis (PEP) for Rabies-exposed person and animals to prevent the fatal onset of disease, together with education to support their effective uptake.

In a vast and diverse country like India, execution of effective mass vaccination drive on millions of free roaming dogs to build herd immunity is an arduous task and need detailed stepwise planning. The 'National Action Plan for Dog Mediated Rabies Elimination from India by 2030 (NAPRE)' is formulated to enable the States to draft their State Action Plans suitable for their States depending upon disease prevalence, population demographics and resource availability.

I wholeheartedly appreciate the efforts of all officers and officials for drafting and getting this document published.

  
(Upamanyu Basu)  
15/9/24





## भारतीय जीव जन्तु कल्याण बोर्ड

### ANIMAL WELFARE BOARD OF INDIA

मत्स्यपालन, पशुपालन और डेयरी मंत्रालय, भारत सरकार  
(पशुपालन और डेयरी विभाग)

Ministry of Fisheries, Animal Husbandry and Dairying, Government of India  
(Department of Animal Husbandry and Dairying)

#### MESSAGE



Rabies is one of the oldest and most terrifying diseases known to man. It is deadly, neglected, and affects the world's most vulnerable populations. In 2015, the world called for action by setting a goal of achieving zero human rabies deaths by 2030. In India large population of stray dogs along with lack of awareness among common people, inadequate surveillance and reporting of animal rabies is the main hindrance to achieve the goal of rabies free India. The only way of achieving this target is clearly defined vision, strategic approach, strong resolution and advocacy at all level of society.

Since 2019, the Animal Welfare Board of India is now under the ambit of Ministry of Fisheries, Animal Husbandry & Dairying. Being a statutory advisory body on animal welfare laws, AWBI promotes animal welfare in the country upholding the provisions of 'Prevention of Cruelty to Animals Act, 1960'. The Department of Animal Husbandry & Dairying and National Centre for Disease Control, Ministry of Health & Family Welfare along with other stakeholders, developed a guideline named '*National Action Plan for Dog Mediated Rabies Elimination from India by 2030 (NAPRE)*'. The document has highlighted the importance of One Health approaches and the crucial role played by the NGOs, AWBI, local governing bodies and the community for responsible dog ownership.

I extend my gratitude to all professionals for their endeavors' to bring out such a guidance document. I sincerely hope that NAPRE will serve as a technical guideline for the States for drawing their own 'State Action Plans' for Rabies elimination for effective control and prevention of dog mediated rabies.

(Dr. O. P. Chaudhary)  
Chairman, AWBI







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सत्यमेव जयते

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स्वास्थ्य सेवा महानिदेशालय  
Government of India  
Ministry of Health & Family Welfare  
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### Foreword

I am very pleased to you to share this document on “National Action Plan for Dog Mediated Rabies Elimination from India by 2030”. This document describes India’s strategic plan for the elimination of human dog- mediated rabies, an invariably fatal disease in humans, livestock and other mammals by year 2030.

Rabies is classic example of a zoonotic disease that is preventable in humans by controlling the disease in animals. Elimination is achievable through mass dog vaccination because dogs are responsible for transmission of over 98% of all human rabies. Rabies causes approximately 59,000 human deaths worldwide annually and this burden remains highest in the developing world, with more than 95% of all human deaths occurring in Africa and Asia. Rural populations, especially children aged below 15 years are at greatest risk of rabies exposure. The cost associated with post-exposure prophylaxis in humans is high and exceeds the cost of rabies control in animals through dog vaccinations.

In comparison to other communicable diseases, Rabies is preventable yet incurable; therefore, focus should be given to control and eventual elimination. Eliminating rabies from the dog population is the key to stopping human rabies. Success in canine rabies elimination has been demonstrated in developing countries including Latin America and Asia, where sustained mass vaccination of dogs was shown to be the single most cost-effective intervention for controlling and eliminating canine rabies and consequently human rabies.

This Rabies elimination strategy as per “National Action Plan for Dog Mediated Rabies Elimination from India by 2030” will guide systematic reduction of the disease risk through sustained mass dog vaccinations, pre and post-exposure prophylaxis in humans and public education. This strategy is based on activities planned in accordance with the Stepwise Approach to Rabies Elimination (SARE) for the country to move from an endemic state to a disease-free status.

Successful implementation of this strategy requires a multi-sectoral collaborative approach with involvement and support of many stakeholders. We are optimistic that each of our partners will join hands and play their role in eliminating human dog-mediated rabies in India by year 2030.

(Sunil Kumar)







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## PREFACE

Rabies is one of the oldest recognized Zoonotic diseases with almost 100% case fatality rate. The diseases cause extremely painful deaths where patient suffers from painful spasms and dies of extreme thirst and hunger because of hydrophobia.

In India, the disease is reported throughout the year and from all parts of the country with the exception of water-locked islands of Lakshadweep and Andaman and Nicobar. The Integrated Diseases Surveillance Program of Govt. of India reports approximately 6-7 Million Animal Bites each year, of which more than 95% are by dogs. This fatal disease is completely preventable by timely and appropriate Post Exposure Prophylaxis (PEP) which includes proper wound toilet and administration of Anti Rabies Vaccine and Anti Rabies serum as per the national guidelines.

Globally many countries have achieved Rabies elimination and there is Global call for Rabies Elimination i.e. "Rabies: Zero by 2030". To address the issue of Human Rabies, National Rabies Control Program (NRCP) was launched by Ministry of Health and Family Welfare, Govt. of India during 12<sup>th</sup> five-Year Plan for implementation in all States and UTs. The objectives of the program are to prevent human deaths due to Rabies. The strategies of the program include capacity building of health professionals on appropriate animal bite management, advocacy for scaling up implementation of cost effective Intradermal (ID) route for Rabies prophylaxis, strengthening surveillance of animal bites and Human Rabies cases, strengthening Rabies diagnostics, increasing awareness in general community and inter-sectoral coordination.

"The National Action Plan for Dog Mediated Rabies Elimination from India 2030" in a with stakeholder guidance document for all States and UTs and developed after intensive technical consultations with One Health Approach

I sincerely hope that this document will be useful for the State/UTs to develop the operationally feasible State action plans for Rabies control as per their need and will help them to progressively achieve the target of Rabies free India in near future.

(Dr. Sujeet Kumar Singh)



**Antibiotic Resistance Containment Stewardship: Our Role, Our Responsibility**  
**Judicious Use of Antibiotic: Key to Contain Antibiotic Resistance**





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# ABBREVIATIONS

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ABC-AR	Animal Birth Control- Anti Rabies
APCRI	Association for Prevention and control of Rabies in India
ARC	Anti -Rabies Clinic
ASCAD	Assistance to States for Control of Animal Diseases
AWBI	Animal Welfare Board of India
AWO	Animal Welfare Organization
CABC	Community-based Animal Birth Control
CNS	Central Nervous System
CRI	Central Research Institute, Kasauli
CSF	Cerebrospinal Fluid
DAHD	Department of Animal Husbandry and Dairying
DALYs	Disability-Adjusted Life Years
DCGI	Drugs Controller General of India
DFA	Direct Fluorescent Antibody Assay
DPM	Dog Population Management
DPMU	District Programme Management Unit
DRIT	Direct Rapid Immune Histochemical Test
ELISA	Enzyme-Linked Immunosorbent Assay
FAO	Food and Agriculture Organization
FAT	Direct Fluorescent Antibody Test
FAVN	Fluorescent Antibody Virus Neutralization
GDVASU	Guru Angad Dev Veterinary and Animal Sciences University
GIA	Grant in Aid
HRIG	Human Rabies Immunoglobulins
IAP	Indian Academy of Pediatrics
IAPSM	Indian Association of Preventive and Social Medicine
ICAR	Indian Council of Agriculture Research
ICMR	Indian Council of Medical Research
ID	Intradermal
IDRV	Intradermal Rabies Vaccination
IDSP	Integrated Disease Surveillance Programme
IEC	Information, Education and Communication
IFA	Indirect Immunofluorescence Assay
IHC	Immunohistochemistry on formalin-fixed samples
IHIP	Integrated Health Information Platform
IM	Intramuscular
IMA	Indian Medical Association

IU	International Units
IVRI	Indian Veterinary Research Institute'
IVA	Indian Veterinary Association
IVPH	Indian Veterinary Public Health Association
KVK	Krishi Vigyan Kendra
LFA	Lateral Flow Assay
MoAFW	Ministry of Agriculture and Farmers Welfare,
MoFAHD	Ministry of Fishery, Animal Husbandry & Dairying
MoHFW	Ministry of Health & Family Welfare
MoHRD	Ministry of Human Resources Development
MoHUA	Ministry of Housing & Urban Affairs
MoPR	Ministry of Panchayati Raj
MoST	Ministry of Science and Technology
NADRES	National Animal Disease Referral Expert System
NCDC	National Centre for Disease Control
NFDI	National Free Drug Initiative
NGO	Non-Governmental Organization
NHRC	National Human Rights Commission
NIMHANS	National Institute of Mental Health & Neurosciences
NIVEDI	National Institute of Veterinary Epidemiology and Disease Informatics
NOHPPCZ	National One Health Programme for Prevention and Control of Zoonoses
NPO	National Program Officer
NRCP	National Rabies Control Programme
OIE	Office International des Epizootic (World Organization for Animal Health)
PEP	Post-exposure Prophylaxis
PI	Pasteur Institutes
PRM	Panchayati Raj Members
RFFIT	Rapid Fluorescent Focus Inhibition Test
RKVY	Rashtriya Krishi Vikas Yojna
RRL	Regional Referral Laboratories
RTCIT	Rabies Cell Culture Inoculation test
RT-PCR	Reverse Transcription Polymerase Chain Reaction
SAARC	South Asian Association for Regional Cooperation
SBM	Swachh Bharat Mission
SDG	Sustainable Development Goal
SMSMC	Sawai Man Singh Medical College
SOP	Standard Operating Procedure
SPMU	State Project Management Unit
TANUVAS	Tamil Nadu Veterinary and Animal Sciences University
TLP	Triple Layer Packaging
VRDL	Virus Research Diagnostic Laboratory

# ABOUT THE DOCUMENT

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Rabies is one of the most fatal zoonotic diseases which has tormented humans since antiquity. It is transmitted after the bite of a rabid animal and is 100 % fatal if the timely intervention in terms of appropriate management of wound and Rabies post exposure is not given to the animal bite victims. About 96% of the mortality due to Rabies is associated with dog bites.

Effective prevention and control of Rabies could be achieved by concerted efforts by all stakeholders by adopting “One Health Approach”. The Ministry of Health & Family Welfare, Government of India; has already rolled out National Rabies Control Program in 12th FYP.

The Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry & Dairying, GoI is assisting State Governments for canine anti Rabies vaccination under ASCAD and RKVY Schemes. Animal Welfare Board of India (AWBI) is providing financial aid to the registered NGOs for Animal Birth Control (ABC) programmes for dog population management. In addition to these, State funds are also being utilized by Municipalities and State Animal Husbandry Departments for carrying out ABC programmes and dog vaccination.

This “National Action Plan” for Rabies Elimination in India has been developed with inputs by experts nominated by the different stakeholders. The National Action Plan for the Elimination of dog-mediated Rabies (NAPRE) in India provides a broad framework for combating Rabies. The NAPRE is a guidance document for the states / stakeholders to develop their own action plan, specific to their needs and aims at systematic reduction of Rabies risk through sustained mass dog vaccinations, pre- and post-exposure prophylaxis and public education until the country is completely free of dog-mediated Rabies. This document will help in the following: -

1. To prepare an action plan that centers on the elimination of human Rabies transmitted by dogs.
2. To strengthen the States to the commitment on implementation of NAPRE.
3. To ensure, for as long as possible, continuity of prevention of human Rabies with effective, quality assured and accessible vaccinations for all who need them.
4. To strengthen capacities of the Public Health Services, Veterinary Services and the local governing bodies.
5. To identify and support activities that when strategically used would eliminate dog mediated Rabies.
6. To strengthen the coordination and support mechanisms among all stakeholders.
7. To obtain and sustain high-level political commitment at the central and state level.
8. To encourage community participation in urban and rural areas.

# EXECUTIVE SUMMARY

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Rabies is a neglected tropical zoonotic disease transmitted through the bite of rabid animal mostly by dogs which is almost hundred percent fatal yet hundred percent preventable by timely vaccination. As per WHO estimates, globally, there are 59,000 human deaths due to dog-mediated rabies. India contributes to one-third of the total global burden due to rabies and two-third of rabies burden in the South East Asia Region as per the WHO-APCRI 2004 Survey. In 2015, the world called for action by setting a goal of “Zero human deaths due to dog-mediated rabies by 2030”, worldwide. Subsequently, four organizations – the World Health Organization (WHO), the World Organization for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO), and the Global Alliance for Rabies Control (GARC) – have joined forces, as the United Against Rabies collaboration, and determined to reach the global target of “Zero human deaths due to dog-mediated Rabies by 2030”. Countries like Western Europe, Canada, the US, Mexico, Japan & Latin America have already eliminated dog-mediated Rabies through successful canine rabies vaccination and One health approach.

In India, Rabies is endemic in all States/UTs except Andaman and Nicobar, and Lakshadweep Islands, and 96% of the mortality and morbidity due to Rabies is associated with dog bites. Although Rabies affects people of all age groups, children are the most vulnerable which constitutes 40% of people exposed to dog bites in Rabies-endemic areas.

Ministry of Health and Family Welfare, Government of India is implementing the National Rabies Control programme since the 12th Five Year plan. Efforts are also being undertaken by the veterinary sector and other stakeholders. NCDC in collaboration with the Ministry of Animal Husbandry organized a workshop on “Stepwise Approach for Rabies Elimination” with technical support from GARC (Global Alliance for Rabies Control). Gaps were identified in the ongoing National Rabies Control Program as well as activities undertaken by veterinary sectors and other stakeholders. Combined with the lessons edlearned from SARE workshop, international consultations on rabies, NRCP review meetings, discussions held during the National technical advisory group on Rabies, Standing Committee on Zoonoses, and external evaluation of the programme, it was felt, that to address the Rabies in the country, One Health Approach is required through concerted and coordinated efforts by all stakeholders. Accordingly, the “National Action Plan for dog mediated Rabies Elimination from India by 2030” (NAPRE) was conceptualized in the year 2018 by the Division of Zoonotic Disease Programme at NCDC and submitted to Ministry. Accordingly, a core committee was constituted under the chairmanship of DGHS and Commissioners animal husbandry. The core committee was having the representation of all key technical experts. Subsequently, the draft was circulated and comments were obtained from the stakeholders namely MoFAHD, MoEF&CC, MoAFW, MoPRI, and MoHUA, and other stakeholders such as NITI Aayog, MoST, NHRC, professional bodies, eminent veterinarian, medical and wildlife experts. A total of 30 key representative stakeholders provided their inputs including hon’ble members of parliament. The NAPRE document was also widely circulated and uploaded on the NCDC website for public comments and it was deliberated in detail during National Webinar organized on World Rabies Day 2020. After incorporating all the relevant inputs, the final document was approved by DGHS, Secretary, Health and Family Welfare, and Hon’ble Union Minister of Health and Family welfare.

The NAP-RE is a guidance document for the states / UTs and stakeholders to develop their action plan, specific to their needs and aims at systematic reduction of Rabies risk through sustained mass dog vaccinations, pre and post-exposure prophylaxis, and public education until the country is completely free of dog-mediated Rabies.

The NAPRE has identified key stakeholders, supporting stakeholders, and partner institutes based on their mandates, existing roles, and responsibilities. Key stakeholders will act as a nodal agency for the overall



formulation, planning, coordination, and implementation of the activities as envisaged under National and State Action Plan of Rabies Elimination They will be directly involved in providing technical and logistic support to the State/District and below level. They will also help in formalizing the State Action Plan for Dog mediated Elimination of Rabies.

Supporting stakeholders are those who would be assisting the key stakeholders in the coordination and implementation of various aspects of the NAPRE. They will provide technical assistance in activities planned for Rabies Elimination from India under various components.

Other stakeholders will include Non-Government organizations active in the field of Rabies in the Health and Veterinary sectors, Professional organizations and associations in the medical and veterinary sector, and International Development organizations UN agencies and private hospitals, institutions, clinics, diagnostic labs both in veterinary and health sector. They would be primarily assisting in the implementation of the NAPRE with the available logistics and expertise and provide support to the key stakeholders at the field level.

The NAPRE has identified three key principles for rabies elimination, i.e. "Prevention" by the introduction of cost-effective public health interventions to improve accessibility, affordability, and availability of post-exposure prophylaxis in the community. "Promotion" to improve understanding of Rabies through advocacy, awareness, education, and operational research. "Partnership" by providing coordinated support for the anti-rabies drive with the involvement of community, urban and rural civil society, government, private sectors, and international partners. The NAPRE has identified two core components to achieve the Dog Mediated Elimination of Human Rabies, a human health component, to prevent human deaths due to Rabies by ensuring timely access for -post-exposure prophylaxis for all animal bite victims and creating well responsive Public Health System and an Animal health component to achieve at least seventy percent Anti Rabies vaccination coverage among dogs in a defined geographical area annually for three consecutive years.

The NAPRE has identified key strategic actions to be undertaken for the operationalization of animal health and human health component. The strategic action for animal health component includes the estimation of the canine population, identification of rabies risk zone, planning & implementing strategic mass dog vaccination programme, solid waste management (SWM), confinement and containment, community participation & operational research, assessment of post-vaccination coverage, dog population management (DPM) and to promote responsible dog ownership. The strategic action for human health component includes ensuring post-exposure prophylaxis for all Animal Bite Victims, training/capacity building of health care professionals, strengthening surveillance of animal bites & rabies cases in humans, inter-sectoral and inter disciplinary coordination, developing information education & communication plans and public-private partnerships.

The NAPRE envisages a step-wise approach for the States to develop their Action Plan as per their needs. The activities envisaged under the human and Animal health component will be undertaken by concerned stakeholders at all levels. The States will identify and nominate State and District Nodal Officer (SNO & DNO) to coordinate with SNO and DNO of NRCP. The Existing veterinary infrastructures of the Animal Husbandry Department, Urban/Rural Governing Bodies, NGOs, and Municipal corporation would be utilized.

The activities of the Human health component are already being implemented under National Rabies Control Programme through the State and District Nodal Officer (SNO & DNO) under National Health Mission.

Surveillance is a key element in NAPRE so that problems can be easily identified, and actions could be undertaken taken in a timely manner. NAPRE envisages developing a dedicated portal and GIS-enabled electronic surveillance system for establishing a Joint Rabies Surveillance Network and Integrated Data sharing mechanism for local, state, and central agencies. The portal would provide essential information on animal Rabies, human Rabies, dog bites, availability of Rabies vaccine & Immunoglobulins for the states and other partner organizations on real-time Basis. This system would provide linkages between health, veterinary, and wildlife sectors at an appropriate level and thus enable systematic data sharing on agreed parameters identified in the NAPRE. This will help to analyze the situation and strengthen intersectoral coordination and appropriate public health actions by concerned stakeholders.

The NAPRE has defined joint monitoring mechanisms with specific indicators for both human and animal health components at all levels, independent component-wise monitoring by the concerned stakeholder, and independent external evaluation of the state action plan. This document describes phase-wise activity matrix and road map for State action plans.

To summarize the NAPRE strategic document based on the One Health approach will enable India to reach the Global target of death due to Rabies, Zero by 2030.



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# 1

## Historical Perspective of Rabies in India

Rabies is one of the oldest diseases known to man and has been widely documented by the earliest human civilizations. As per historians, the origin of the word Rabies is either from the Sanskrit “*rabhas*” (to do violence) or the Latin “*rabere*” (to rage). [The ancient Greeks called Rabies “*lyssa*” (violence).

A disease akin to Rabies was recognized in ancient Indian treatises on health and medicine. The *Susruta Samhita* (Susruta’s Compendium) details various medical conditions and surgical procedures and discusses in detail the symptoms of Rabies in humans bitten by rabid dogs or wild animals, recognizing that once symptoms develop in human victims, the disease is inevitably fatal<sup>1</sup>. The Mughal emperor Jahangir (1569–1627) is recorded to have noted the symptoms of Rabies in an elephant that he owned<sup>2</sup>.

### 1.1 History of Rabies in India:

The medical records during the period of British India show deaths due to Rabies (referred as hydrophobia) was reported from throughout India. The disease also caused extensive mortality in livestock and pet animals such as purebred dogs owned by British officials posted in India. Based on his experience in India published a book in 1822 named “*Sketches of Field Sports as followed by the Natives of India with Observations on the Animals*”. This book has a chapter titled “*Observations on hydrophobia and rabid animals*” that describes symptoms in humans in graphic detail. A booklet on Ayurvedic treatments for various illnesses published in 1876 from Cochin, in present-day Kerala, includes symptoms of Rabies and traditional treatment methods for exposure to “*Peppatti Visham*” (poison from a rabid/mad dog) such as chants, pills and powders made from plant parts. “*Buisson baths*” a practice used for the treatment of Rabies at *Allahabad, Ferozepore* and *Sialkote* is also documented in 1898.

### 1.2 Rabies Vaccine in India:

As is well known that French scientists, *Louis Pasteur and Émile Roux* developed the first Rabies vaccine in 1885, resulting in the establishment of Pasteur Institutes (PIs) in various parts of the world for the production of Rabies vaccines. Initially, individuals exposed to Rabies in India had to undertake a long journey to the Pasteur Institute in Paris for treatment, thereby affecting their chances of survival.



**Figure 1 Sir Louis Pasteur (December 27, 1822 - September 28, 1895)**

The first Pasteur Institute in India started functioning at the hill station of Kasauli in 1900 under David Semple, a medical officer of the colonial Indian Medical Service. Within a short period, the Pasteur Institute at Kasauli served as the main destination for treating increasing numbers of individuals, both civilians and soldiers, exposed to Rabies by vaccine produced at the institute.

The decentralized centres of Pasteur Institute were established throughout British India:

1. Coonoor (1907)
2. Rangoon (in present-day Myanmar) (1915)
3. Shillong (1917)
4. Bombay (Present Mumbai) (1922)
5. Calcutta (Present Kolkata) (1924)
6. Patna (1928)

Pasteur Institute at Kasauli also became the site for extensive research into safer and more effective Rabies vaccines since the vaccines in use at the time often resulted in serious neurological complications. The Pasteur Institute of India (PII) produced neural tissue Anti-Rabies vaccine in 1907. One of the key events in the history of Rabies vaccines was the development of a phenol-inactivated nerve tissue vaccine by David Semple it was based on Pasteur's original work and was developed through experiments and trials on patients at Kasauli (1911). By 1938, the Kasauli institute had over 140 outcentres in the northern provinces and other Indian states, while the Coonoor institute had 223 outcentres in Madras Presidency and southern states. Hundreds of animals were also examined every year at PIs, veterinary colleges and other institutions like the Haffkine Institute in Bombay (Present Mumbai) to confirm a diagnosis of Rabies.

Around 1955, there was a transition from vaccines prepared from animal nerve tissue to embryonated eggs and very soon afterward, around 1960, to the adaptation of Rabies virus to cultures of human diploid cells. The development of this vaccine, which remains the reference vaccine in comparative studies of immunogenicity, took long years. It was first registered in France in 1974 and a little later in North America. The late 1970s and the 1980s saw the development of a plethora of vaccines prepared on various cellular substrates such as primary explant cells of hamster, dog or fetal calf kidney, fibroblasts of a chicken embryo, or diploid cells from a rhesus monkey, fetal-lung, and finally cells from continuous lines (Vero cells). The production of some of these vaccines was stopped by the end of the 1980s whilst others have been administered to millions of patients.

An inactivated Rabies vaccine for human use was first prepared in cell culture in 1964. In 1966 it was shown that the human diploid cell (HDC) strain WI-38 was a suitable substrate for the propagation of the Pitman-Moore (PM) strain of fixed Rabies virus. The original procedure to produce this vaccine was described in the third edition. Since 1967, research and development have been carried out on this vaccine at the Mérieux Institute, Lyon, France. The vaccine was first licensed for use in France in 1974 and commercial production started in 1978.

Over a period of time with available scientific advancements and evidences, there has been a paradigm shift concerning the type of vaccine, dosing schedule and route of administration (intramuscular and intradermal) to be adopted for rabies prophylaxis.

The Nerve Tissue Vaccine (NTV) production was stopped (2004) in the country and modern cell culture vaccines (CCVs) was recommended for use for PEP.

The World Health Organization (WHO) in 1992 had recommended the administration of Rabies vaccines by intradermal (ID) route in those countries and areas where there is a resource crunch. The ID Rabies vaccination was effectively used in *Thailand, Philippines* and *Srilanka* to successfully reduce the burden of human Rabies in those countries. The higher cost of intramuscular administration of CCV is a limiting factor for its wider use in India and hence, in February 2006, as per WHO recommendations, results of clinical trials on safety, efficacy and feasibility, the Drugs Controller General of India (DCGI) approved the use of safe, efficacious, and economical Intra-dermal (ID) route of inoculation of CCVs.

National Centre for Disease Control (formerly known as National Institute of Communicable Diseases), Delhi, a WHO Collaborating Centre for Rabies Epidemiology, organized an expert consultation in 2002 to formulate “National Guidelines for Rabies Prophylaxis” to bring out uniformity in pre-and post-exposure prophylaxis (PEP) practices. These guidelines were revised through an expert consultation in 2007, 2013 and 2019.

### **1.3 National Rabies Control Program – Pilot Project, an initiative under the 11<sup>th</sup> Five Year Plan:**

In the 11th five-year plan (2007–2012) Rabies control efforts in India gained momentum and the Ministry of Health and Family Welfare, Govt of India approved a “Pilot Project for the Control of Human Rabies”, for which ₹ 8.65 crores were allocated. For the first time, Rabies control in animals, animal birth control and vaccination of stray dogs were mentioned in this plan, as components of animal welfare to be handled by the Animal Welfare Board of India.

The project was implemented by NCDC in 5 cities *Delhi, Ahmedabad, Pune, Bangalore* and *Madurai* and the project began in January 2008 and continued till 2012. The objectives of the project were prevention of human deaths due to Rabies, enhancing awareness in the general community, developing trained health manpower, strengthening diagnostic facilities, strengthening surveillance and maintenance of continuous surveillance and sensitization of other sectors. Experience gained in the pilot project indicated that strategy is feasible, reproducible, and implementable. With the lessons learned in the pilot project, the Ministry of Health and Family Welfare approved National Rabies Control Programme (NRCP) in the 12th Five Year Plan for rollout in the entire country. During the 12th Five years plan, from 2014 to 2017, a small pilot was also taken to test the strategy of Animal Health Components in Haryana and Chennai through the Animal Welfare Board of India (AWBI) under the aegis of the *Ministry of Environment, Forest and Climate Change*, Govt of India. From the financial year 2019-20 onwards, human health component activities at the State and District level are being funded by the *National Health Mission* for program implementation and planning mechanism.

In the year 2015 for the first time, four organizations – the WHO, OIE, FAO and GARC – have joined forces, as the United Against Rabies Forum and are determined to reach this goal. In 2015, the world called for action by setting a goal of zero human dog-mediated Rabies deaths by 2030, worldwide. After this, India also stepped-up efforts for Rabies Elimination by strengthening the National Rabies control program which was highlighted in National health Policy 2017.



Figure 2 Milestones of Rabies Control Efforts in India



# 2

## Epidemiology of Rabies

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of the study to control health problems<sup>3</sup>. Understanding the epidemiology of zoonotic infections like Rabies involves the study of disease and its transmission patterns among host and reservoirs. This chapter describes the magnitude of the Rabies, etiological agent of Rabies, modes of transmission, diseases manifestation in hosts and reservoirs species.

### Magnitude of the Disease

#### 2.1 Global

The number of human deaths globally due to dog-mediated Rabies is estimated to be 59000 annually, with an associated loss of 3.7 million DALYs. The overall economic cost of dog-mediated Rabies was estimated to be US\$ 8.6 billion<sup>4</sup>. Most of the deaths are estimated to have occurred in Asia (59.6%) and Africa (36.4%).

#### 2.2 Rabies in India

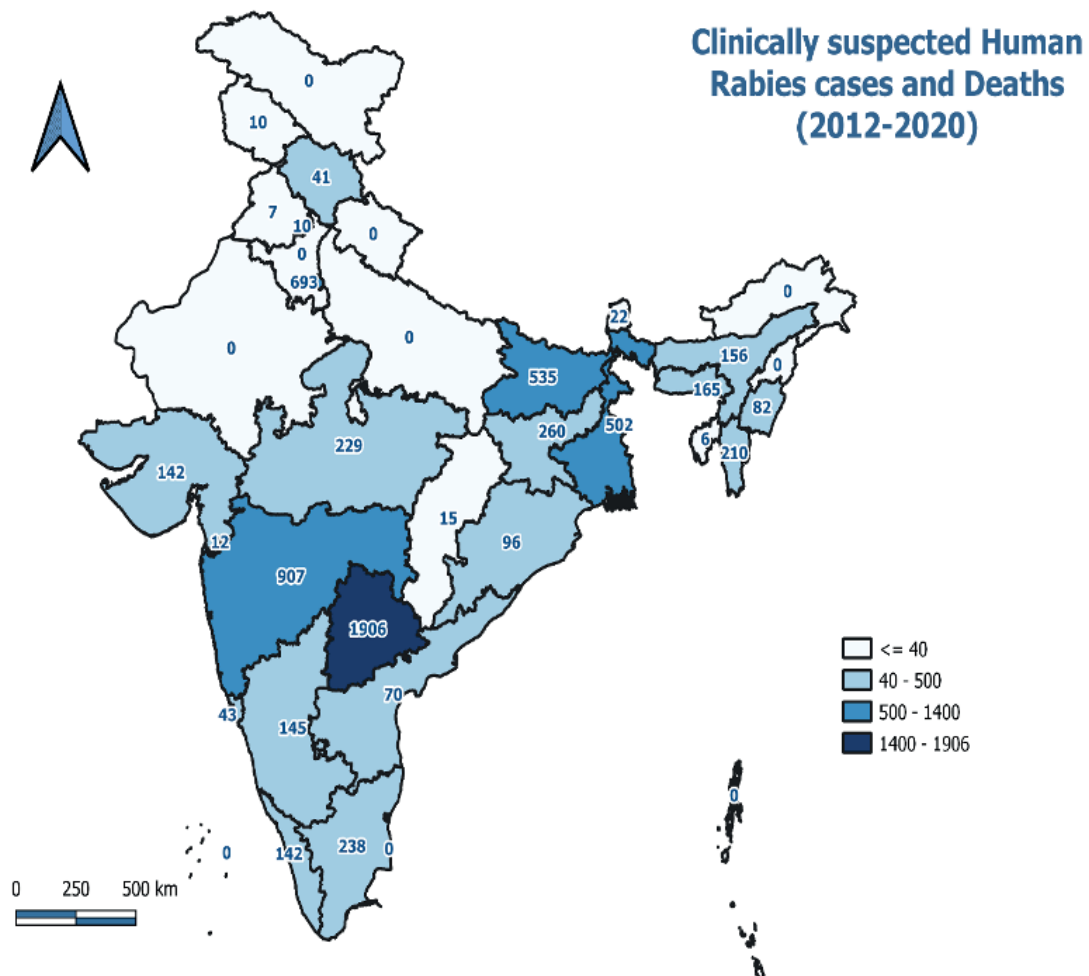
In India, Rabies is transmitted commonly by dogs and cats (~97%), followed by wild animals (2%) such as mongoose, foxes, jackals, and wild dogs, and occasionally by horses, donkeys, monkeys, cows, goats, sheep, and pigs. Rodents, rats and bandicoots, squirrels, rabbits, birds, and bats are generally not known to transmit Rabies. The presence of unvaccinated free-roaming dogs (FRD) or street dogs, amidst human settlements is a major contributor to the high incidence of Rabies in India, which is endemic. Apart from humans, Rabies also causes significant mortality among livestock animals such as bovine, cattle and small animals.

##### A. Rabies in Humans

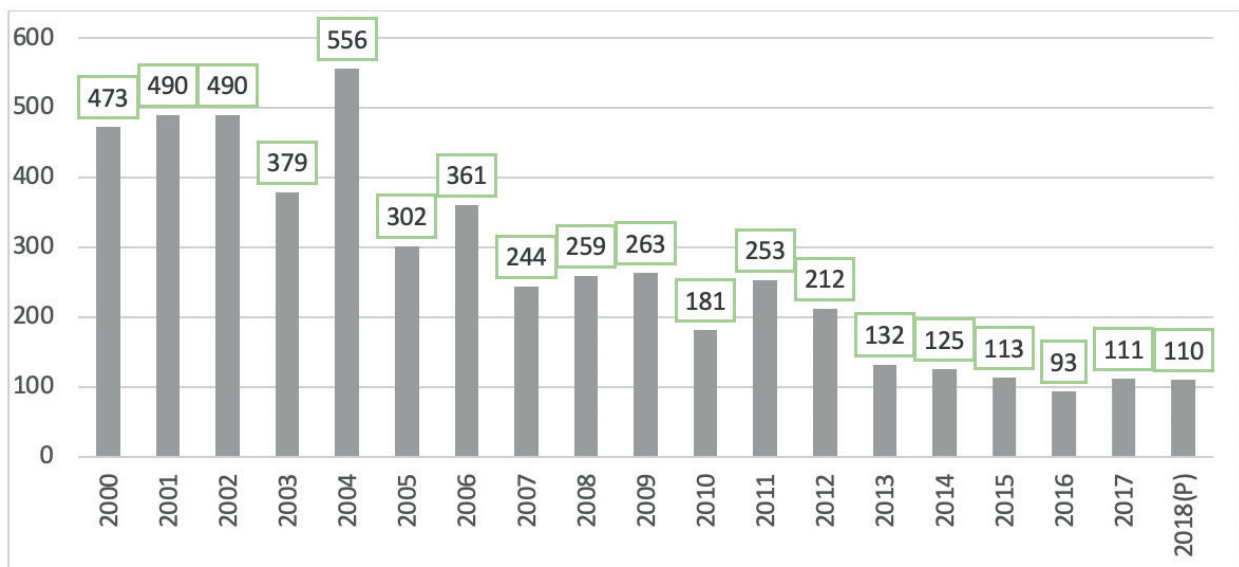
Rabies is endemic throughout the country and human cases of Rabies are reported from all over throughout the year except for Andaman & Nicobar and Lakshadweep Islands. In India, about 96% of the mortality and morbidity due to Rabies is associated with dog bites. Although Rabies affects people of all age groups, children are the most vulnerable which constitutes 40% of people exposed to dog bites in Rabies-endemic areas. Different studies quote different figures of Animal Bites incidence and deaths due to Rabies in humans. As per WHO estimates, India accounts for 36% of the global and 65% of the human Rabies deaths in the South East Asia region<sup>4</sup>.

As per the Million Deaths Study 2012, India has an estimated 12700 deaths due to furious Rabies. As per the Central Bureau of Health Intelligence, the trend of the number of Human Rabies Cases reported a declining trend in Deaths due to Rabies through the last decade as depicted in Figure 4.

As per the National Rabies Control Program, 6644 clinically suspected Human Rabies cases and deaths have been reported from 2012 to 2020 as per the reports received from the states and UTs.



**Figure 3 Clinically suspected Human Rabies cases & deaths in India from 2012 -2020 as reported under NRCP with data from 26 states. Software- QGIS, Source of Map <http://projects.datameet.org/maps/states/>**



**Figure 4 Number of Reported Human Rabies Deaths, Source: - Central Bureau of Health Intelligence**

Various research studies in India had identified and estimated the burden of Rabies in India. A brief about the different studies carried out to estimate the burden is summarized in the Table-1 below:

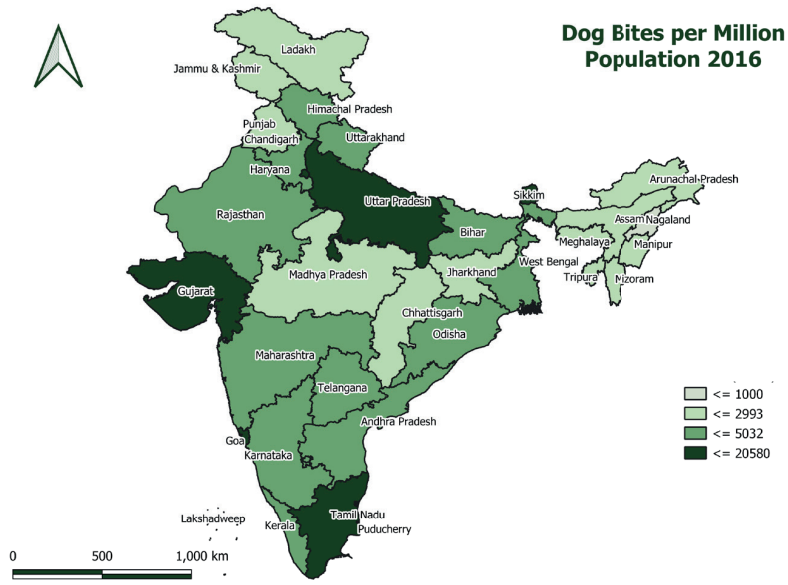
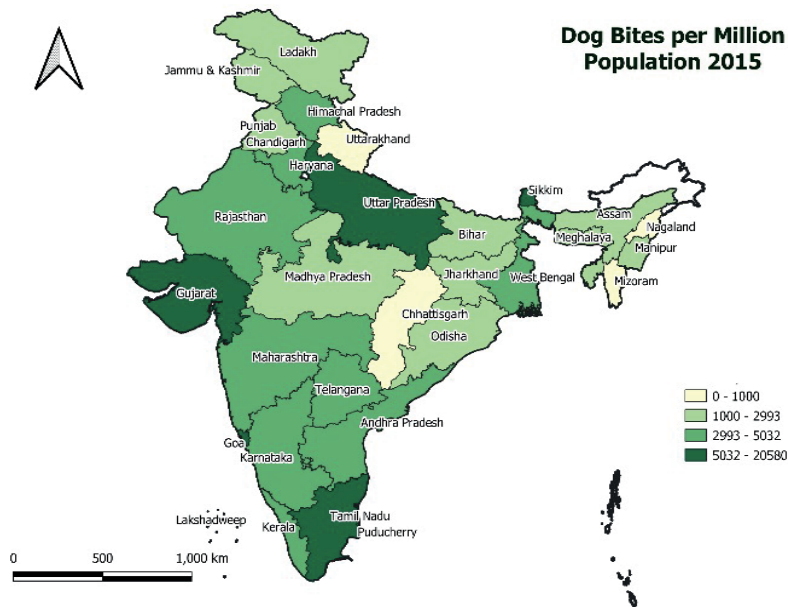
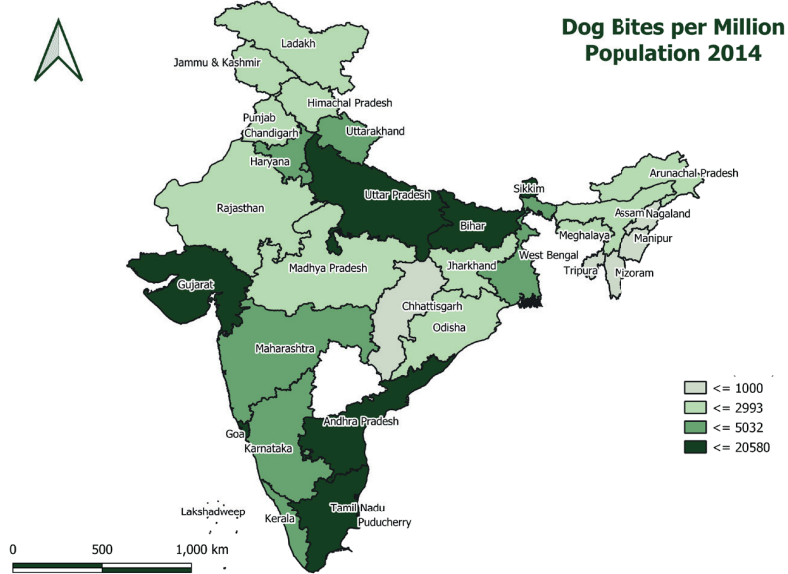


**Table 1 Research Studies identifying burden of Rabies in India**

Year	Estimated Human Rabies Cases in India	Name of the Research Study	Type of Study
1998	30000	World Health Organization   Rabies surveillance and control - The world survey of rabies WHO No 34.; <b>Available from: <a href="https://apps.who.int/iris/handle/10665/66536">https://apps.who.int/iris/handle/10665/66536</a></b>	Survey
2004	20565	Assessing the burden of human rabies in India: results of a National Multi-centeric Epidemiological Survey. International Journal of Infectious Diseases 2007 Jan11 Sudarshanet al. (1):29–35. <b>Available from: <a href="https://linkinghub.elsevier.com/retrieve/pii/S1201971206000117">https://linkinghub.elsevier.com/retrieve/pii/S1201971206000117</a></b>	Hospital data+ Community Survey
2005	19713	Re-evaluating the burden of rabies in Africa and Asia. Bulletin of the World Health Organization. 2005;11. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda MEG, et al	Dog Bite Probability Model
2012	12700	Deaths from Symptomatically Identifiable Furious Rabies in India: A Nationally Representative Mortality Survey. Suraweera W, Morris SK, Kumar R, Warrell DA, Warrell MJ, Jha P, et al. Zinsstag J, editor. PLoS Negl Trop Dis [Internet]. 2012 Oct 4 [cited 2021 Mar 3];6(10):e1847. <b>Available from: <a href="https://dx.plos.org/10.1371/journal.pntd.0001847">https://dx.plos.org/10.1371/journal.pntd.0001847</a></b>	Enhanced Verbal Autopsy
2015	20847	Estimating the Global Burden of Endemic Canine Rabies. Hampson K, Coudeville L, Lembo T, Sambo M, Kieffer A, Attlan M, et al. (2015 PLoS Negl Trop Dis 9(4): e0003709. doi:10.1371/journal.pntd.0003709	Modelling Study

## **B. Animal / Dog Bites Cases in India**

The number of Animal Bites reported under the Integrated Disease Surveillance Project, has increased from 42 lakhs in 2012 to 72 lakhs in 2020. These bites include bites from animals such as due to dog, cat, monkeys. which requires Rabies Post Exposure Prophylaxis. The Animal bite incidence per lakh population across the States and UTs in India is mapped out in Figure 5.



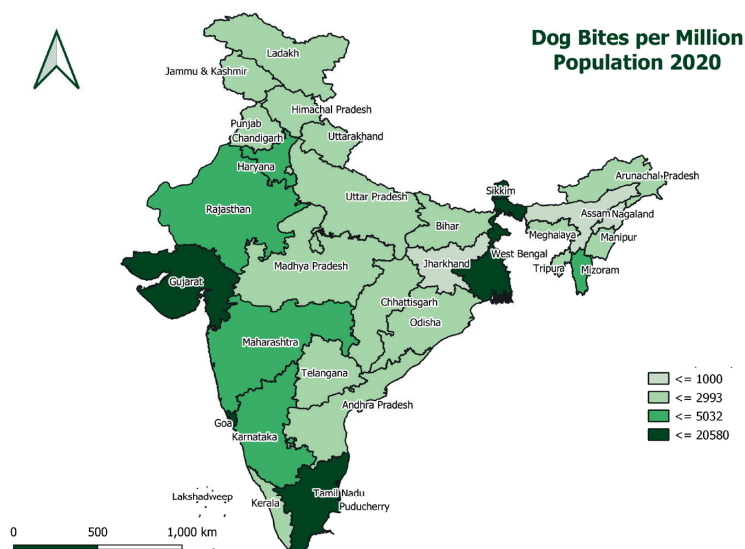
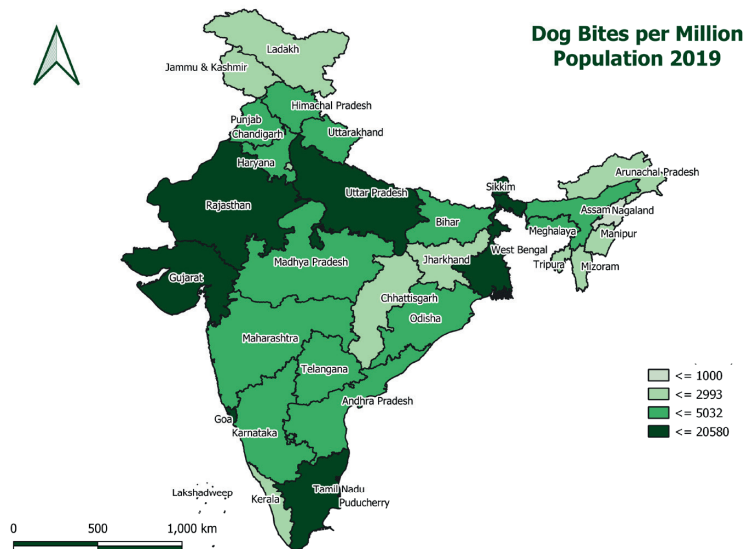
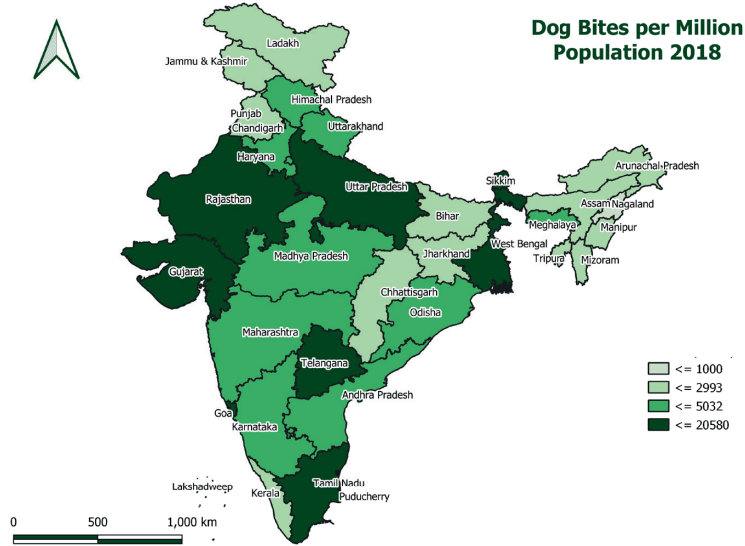


Figure 5 State-wise cases of Dog bites per million human population from 2012 to 2020. Source of Data- IDSP, GoI,

### C. Rabies in Animals

As per the annual reports of the Ministry of Fishery, Animal Husbandry and Dairying, Government of India Rabies have been reported from cattle, buffaloes, canine, ovine and equine species in India. The year-wise reported deaths among cattle, buffaloes, canine and ovine species are 68 (2016); 383 (2017); 383(2018); 196 (2019) and 14 (2020) Figure 6.

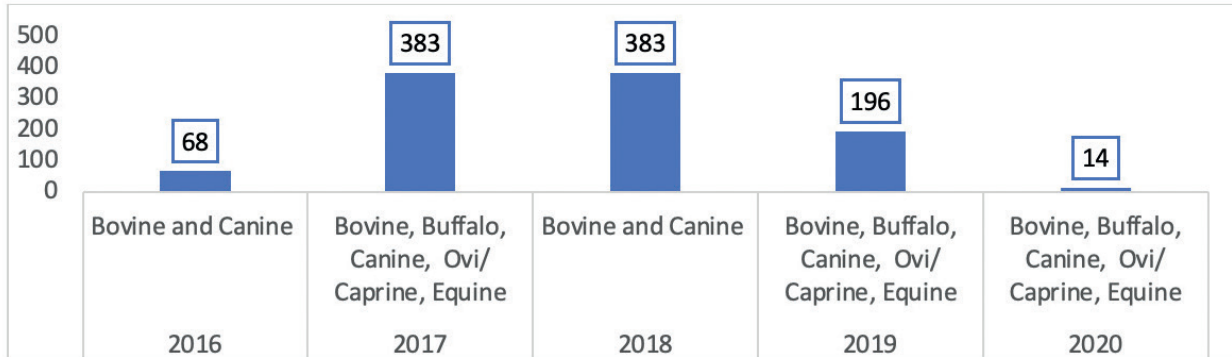


Figure 6 Rabies in Animal as per the annual reports of MoFAHD

### 2.3 Rabies virus

Rabies is an acute encephalitis caused by lyssavirus infection. The etiological agents of Rabies encephalitis belong to the *Mononegavirales* order, the *Rhabdoviridae* family and the Lyssavirus genus (2). Lyssaviruses have a non-segmented RNA genome of negative polarity that encodes five viral proteins (3' to 5'): a nucleoprotein (N), a phosphoprotein (P), a matrix protein (M), a glycoprotein (G) and an RNA-dependent RNA polymerase (or large protein, L). The lyssavirus particle is shaped like a bullet, 100–300 nm long and 75 nm in diameter and can be seen only through an electron microscope. Rabies virus (RABV) is present in the saliva of rabid animals. Upon biting, scratching, or licking on broken skin (cuts/ abrasions) and intact mucus membrane, the virus enters the body<sup>5</sup>.

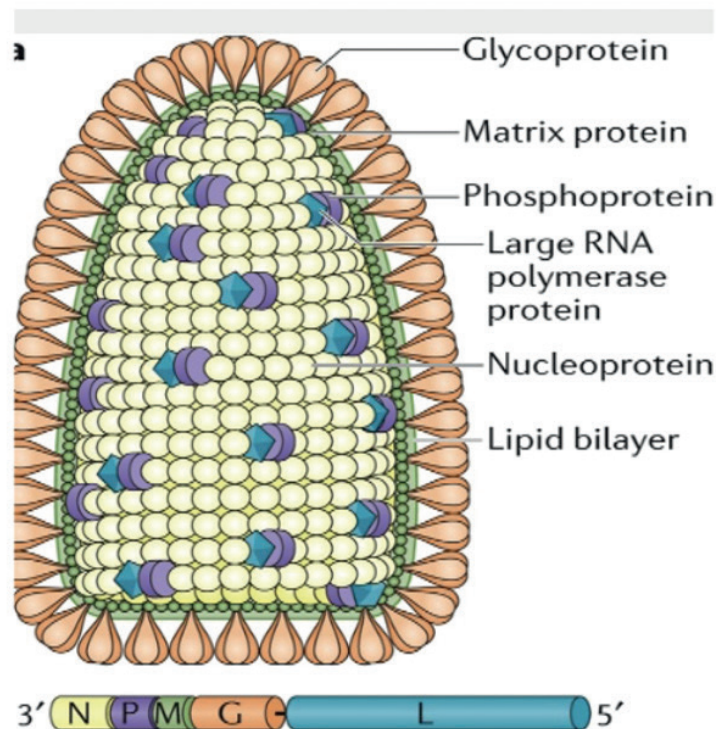


Figure 7 Structure of Rabies Virus.(Source: Fooks, A. R. et al. (2017) Rabies)

## 2.4 Mode of Transmission

People are usually infected following a bite or scratch from an animal with Rabies, and transmission to humans by rabid dogs accounts for up to 99% of cases. It is also possible, but rare, for people to get Rabies from non-bite exposures, which can include scratches, abrasions, or open wounds that are exposed to saliva or other potentially infectious material from a rabid animal. Other types of contact, such as petting a rabid animal or contact with the blood, urine or faeces of a rabid animal, are not associated with risk for infection and are not considered to be exposures of concern for Rabies. Contraction of Rabies through inhalation of virus-containing aerosols or transplantation of infected organs is described, but extremely rare. Human-to-human transmission through bites or saliva is theoretically possible but has never been confirmed. The same applies to transmission to humans via the consumptions of raw meat or milk of infected animals. In some parts of the world, it is reported that Rabies can be transmitted through the exposure of bat. In India so far there is no evidence to suggest the presence of bat transmitted Rabies.

## 2.5 Host Range

All warm-blooded animals are vulnerable to infection by the Rabies virus. However, the degree of species susceptibility varies considerably. In India, the domestic dog is the major reservoir of Rabies<sup>6</sup>.

### A. Rabies in Humans

The virus enters the body through wounds or by direct contact with mucosal surfaces, it cannot cross intact skin. RABV may replicate in muscle or other local tissues after exposure and gains access to motor endplates and motor axons to reach the central nervous system. The incubation period ranges from 3 weeks to 3 months (rarely 4 days to 2 years). Once the virus reaches the CNS, its replication occurs primarily in the neurons or brain cells through viral budding and the virus spreads and infects the nearby brain cells. Further, dissemination through the cerebrospinal fluid (CSF) occurs in the late stages of infection.

Rabies affects brain stem function, causing hydrophobia (fear of water), aerophobia (fear of breeze), and/ or photophobia (fear of light), and finally resulting in respiratory paralysis and death. 80% of human Rabies manifests as furious types and the remaining 20% manifests as paralytic or dumb type.

The furious Rabies manifests as hyperactivity (anxiety, agitation, running, biting, bizarre behavior alternating with periods of calm) which may occur spontaneously or may be precipitated by tactile or auditory, visual or other stimuli. The most characteristic symptom is the spasm of the pharyngeal muscles often triggered by an attempt to drink water (hydrophobia) or by blowing air on the patient's face (aerophobia). Spasmodic contractions of the muscles may spread to the respiratory and other muscles leading to attacks of apnoea.

The paralytic or dumb Rabies manifests as acute progressive ascending myelitis, symmetrical or asymmetrical with flaccid paralysis, pain and fasciculation in the affected muscles with mild sensory disturbance. Complete paraplegia develops eventually with fatal paralysis of the respiratory and pharyngeal muscles.

### B. Rabies in Animals

In general, rabid animals of all species commonly exhibit typical signs of central nervous system disturbances with behavioral changes.

### C. Rabies in Dogs

The incubation period of Rabies in dogs is 3–8 weeks on average but may vary from 10 days to as long as 6 months but is rarely more than 4 months. There may be hyper excitability or lethargy, pharyngeal paralysis and thus frothing of saliva, posterior paresis or paralysis, sudden coma and death. Behavioral changes are common during the early phases of the disease when the dog behaves abnormally, hides in dark corners, shows unusual agitations, becomes restless. Fever, dilatation of the pupils and photophobia are sometimes present. The furious form follows the prodromal phase, and the affected dogs may bite without any provocation. It may bite itself and inflict serious injuries. Some dogs exhibit only a paralytic stage with the characteristic dropped jaw and incoordination. Progressive paralysis begins with the muscles of the head and neck region. The tone



of bark changes due to partial paralysis of vocal cords. Convulsions are seen in the terminal phase followed by incoordination and posterior paresis. Once the clinical signs set in, the disease progresses rapidly to the death of the animal due to respiratory failure generally within 3-8 days.

#### **D. Rabies in Cats**

The clinical signs in cats are of a furious type and are similar to that in dogs but affected cats have a greater tendency to hide in secluded places and are more vicious than dogs. The cat might strike in the air with its forepaws as if it is catching imaginary mice. After 2-4 days of the excitation phase, the paralysis of the posterior third of the body follows.

#### **E. Rabies in Cattle**

Livestock is a vulnerable victims of rabid carnivores and mongooses. The average incubation period of Rabies in cattle is 15 days (depends on the site of bite days) and the average morbidity period is 4 days. The major clinical signs in cattle include excessive salivation, behavioral changes, muzzle tremors, vocalization (bellowing), low-pitched voice due to paralysis of vocal cord (may mistake for heat sign), aggression, hyperesthesia and/or hyperexcitability, and pharyngeal paresis/ paralysis, coma and death.

#### **F. Rabies in Sheep and Goats**

The clinical signs in sheep include head butting, muzzle and/or head tremors, aggressiveness, hyperexcitability, and/or hyperesthesia, trismus, salivation, drooping ears, vocalization, recumbence, and death.

#### **G. Rabies in Horse and Mules**

The signs are similar to tetanus. The average incubation period is 12 days (depends on the site of bite) and the average morbidity period is 6 days with the majority of the horses developing furious Rabies. Muzzle tremors, pharyngeal spasm or pharyngeal paresis, ataxia or paresis, lethargy or somnolence, stamping of the foot, biting and rearing of ears are the common signs manifested by rabid horses.

#### **H. Rabies in Pigs**

The symptoms are characterized by excitement, irritation, rooting up the ground or rubbing at the surface, aggressiveness, biting of hard objects, other animals and man, paralysis and death in 2-4 days.

#### **I. Rabies in Wild Animals**

Rabies is also reported in a wide range of wild species, such as wilds dogs, jackals, coyotes, wolves, foxes and raccoon dogs, skunks, mongooses, bats and raccoons which are the primary hosts of RABV. Wild animals frequently lose their fear of humans, and may attack humans or animal species they would normally avoid (e.g., porcupines) <sup>8</sup>.

Across the world, Wild life Rabies has been documented from *Africa, Continental Asia, Russian Far East, northern China, and Korean Peninsula, Southern China and Taiwan, Israel, West Bank, Gaza Strip and Turkey, Islamic Republic of Iran, Oman, Saudi Arabia, and Yemen & Other Middle East, Asian, European countries, North America, Eastern Canadian border and USA*<sup>6</sup>. In India, wildlife Rabies has been reported in Bear, Hyena, Jackal, Leopard, Mongoose, Sambar deer, Wolf<sup>9</sup>, and fox<sup>10</sup>.

#### **J. Rabies in Monkeys**

Clinical signs exhibited are similar to those in humans with hydrophobia, paralysis, anxiety. Non-human primates play a negligible role in the spread of the virus. In India, Langoor (*Semnopithecus entellus*) and Himalayan Palm Civet (*Paguma larvata*) were found positive for Rabies virus by FAT& BT <sup>8</sup>.

#### **K. Rabies in Bat**

Lyssaviruses have been detected in bats throughout the world. In some parts of the world, it is reported that Rabies can be transmitted through the exposure of bats. In India, so far there is no evidence to suggest the presence of

bat transmitted Rabies. There has been one reported case of Rabies through bat in the year 1954<sup>11</sup>. Since then, no bat-borne Rabies has been reported in India to date.

### L. Rabies in Rodents and Rabbits

Very few examples of RABV infection have been observed in rodents (Table 2). Rodents are not primary hosts and do not play a role in the transmission or maintenance of Rabies. However various animals such as squirrels, moles, shrews, domestic rats, mongoose may look similar to rodents.

**Table 2 Research studies on Cases of Rabies in Rodent and Rabbit identified on Pubmed**

Year	No of Rabies cases in rodents & rabbits	Geographical location
1985 and 1994	368 cases of Rabies in rodents	Centers for Disease Control and Prevention, Atlanta, Georgia (USA) <sup>12</sup>
1995 through 2010	737 rabid rodents and lagomorphs	Centers for Disease Control and Prevention, Atlanta, Georgia (USA) <sup>13</sup>

# 3

## Global efforts for Eliminating Human Rabies

Successful Rabies control programmes have been implemented throughout the world, demonstrating that elimination is technically feasible. Canine Rabies vaccination has helped countries such as the United States and Great Britain to eliminate canine Rabies). Dog-mediated Rabies has been eliminated from *Western Europe, Canada, the United States of America (USA), Japan and some Latin American countries*.<sup>6</sup>

Even the low-income countries such as regions of sub-Saharan Africa and Asia have been able to reduce the burden significantly by mass dog vaccination strategy. In the Philippines and Indonesia, mass dog vaccination campaigns have led to a drastic reduction in cases and good progress towards elimination.

**Table 3 Global efforts by the various countries to eliminate dog mediated canine Rabies**

Location	Activities undertaken	Outcomes
Latin America and the Caribbean 1980–2013	Development of regional programmes for Rabies control involving mass dog vaccinations,	> 97% reduction in human Rabies cases region-wide
	PEP provision, surveillance, and education programmes	
	Regional surveillance system (SIRVERA)	Zero dog-mediated human Rabies reported in 28 of 35 countries
2010– present	Over 5-fold increase in government investment to	>90% reduction in human Rabies cases
	Sustain and expand Rabies control activities in 2017-2022	
	Capacity building: training dog vaccinators and dog catchers	
	Switch from dog population control to mass dog vaccination campaigns	
	Free PEP for bite victims	
Mexico 1990–2000	Media and community engagement	Zero human Rabies deaths
	Mass dog vaccination campaigns	
	National Rabies surveillance system notification Decentralized	



Location	Activities undertaken	Outcomes
Philippines (Visayas) 2010–present	Rabies prevention, activities education and awareness	> 80% decrease in human Rabies cases from 2008 to 2013; > 40% reduction from 2008 to 2015
	Establishment of a national Rabies database	Two provinces, five municipalities and five smaller islands declared Rabies-free
	Mass dog vaccination campaigns	
	Use of dog vaccine banks	
	Free PEP for bite victims	
South Africa (KwaZu- lu-Natal)	Training and awareness materials for medical staff and the public	Elimination of human Rabies in KwaZulu-Natal
	Dog vaccine banks and strategic dog vaccination in high-risk “corridors”	Expansion of control activities to neighboring areas such as Eastern Cape, Lesotho and Swaziland
	Free PEP for bite victims	
	Rabies stimulus packages to support expansion of control activities	
Sri Lanka 1990–2014	National notification of human and animal Rabies cases	> 85% reduction in human Rabies cases
	Mass dog vaccination and sterilization campaigns	
	Free PEP for bite victims	
United of Tanzania (south-east) 2010–2015	Novel mobile phone surveillance system	>75% reduction in animal bite cases (proxy for Rabies expo- sure) across project site.
	Mass dog vaccination campaigns	
	Cost-saving switch from intramuscular to intra-dermal PEP	Local elimination of human cases on Pemba Island by 2014
Bhutan Ongoing	Dog Vaccination	Reduction in human Rabies cases
	Dog Population Management activities in southern districts,	
	Cross-border control of dog movement	

The concerted efforts by all Stakeholders and integrated One Health played a key role for the above countries as to achieve the target of rabies control and elimination.

# 4

## International Guidelines for Countries/ Geographical regions for declaring themselves ‘Rabies- Free’

In 2015, the world called for action by setting a goal of “Zero human dog-mediated rabies deaths by 2030”, worldwide. Subsequently, four organizations – the World Health Organization (WHO), the World Organization for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO) and the Global Alliance for Rabies Control (GARC) – have joined forces, as the United Against Rabies collaboration, and are determined to reach the global target of “Zero human deaths due to dog-mediated Rabies by 2030”. Worldwide, harmonized processes are required to acknowledge and measure country progress towards this goal.

The “*United Against Rabies forum*” has divided the endemic countries into 5 stages as per the status of their Rabies control activities (figure 8). Given the current situation of rabies Control efforts, India falls in Stage 3.

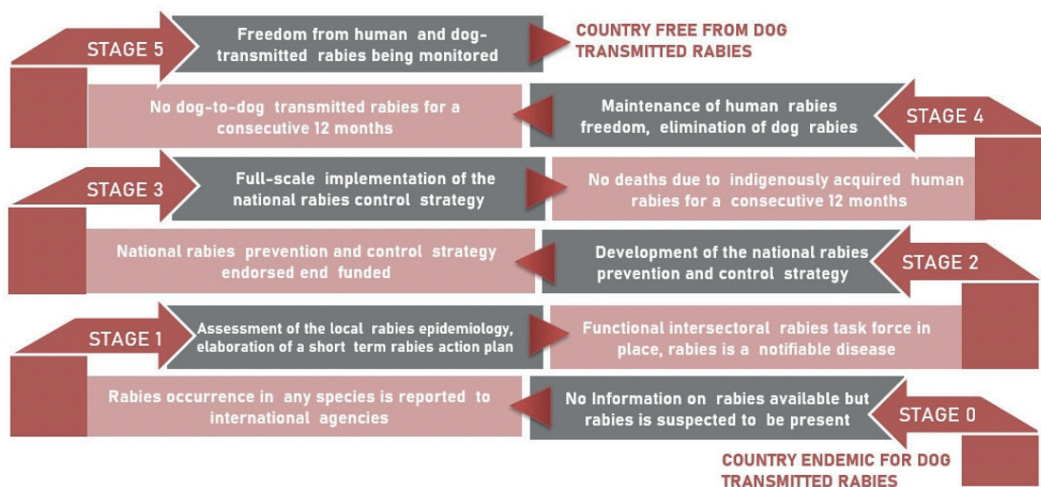


Figure 8 Stages of a country for declaring Rabies free as per United Against Rabies forum

WHO has also divided countries into 5 different stages of Rabies elimination<sup>6</sup>

- i. **Endemic stage-** ‘Endemic’ indicates the number of confirmed Rabies cases per month in an endemic country with limited control measures in place.
- ii. **Control stage-** Indicates a steep decrease in Rabies incidence after mass interventions.
- iii. **Zero human Rabies Death-** Shows interruption of dog-human Rabies transmission and no human deaths.
- iv. **Elimination Stage-** Shows interruption of Rabies transmission and no canine case.
- v. **Maintenance Stage-** Refers to continuing freedom from disease, e.g., by preventing incursion and/or re-emergence of canine or human Rabies. As per WHO, many countries have yet to reach zero human Rabies deaths, while others have, or are close to the elimination stage of interrupting Rabies disease transmission.

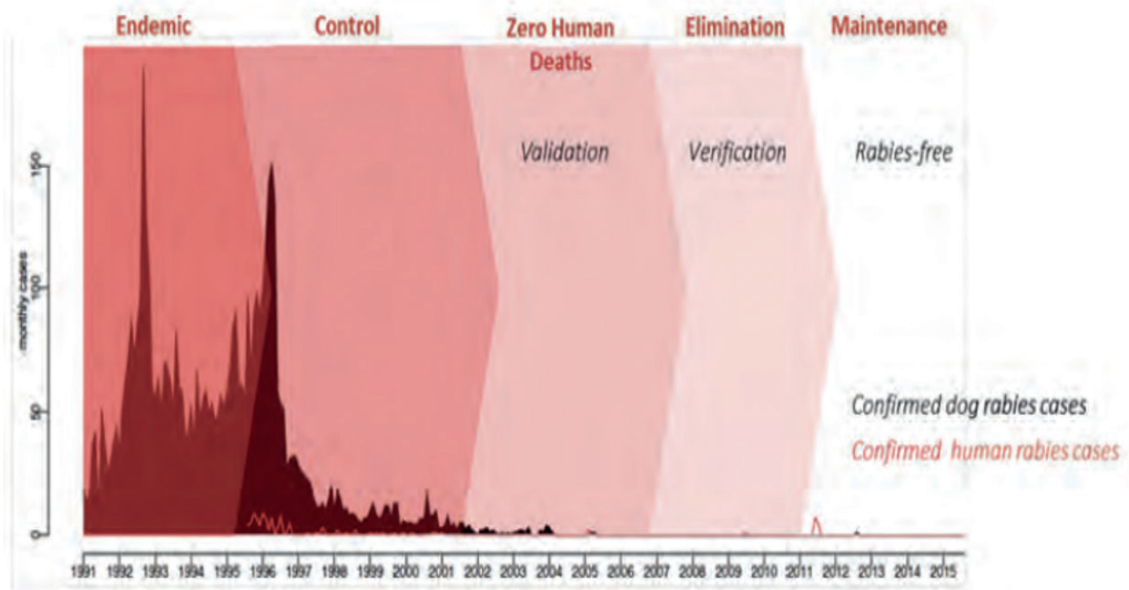


Figure 9 The figure is based on a country data and shows progression of a country for Rabies elimination (in terms of canine and human Rabies cases) in a continuum of five phases, from endemicity, to elimination, to maintaining freedom from disease.

## 4.1 Reaching “Zero human deaths from Rabies”

This section aims to define activities that allow a defined geographical region (Country/State /UT) to validate, verify and be declared as rabies as per International Standards (WHO):

1. Validate elimination of Rabies as a public health problem, i.e., reaching zero human Rabies deaths, defined as the absence of human death from dog-mediated Rabies for at least 24 months in a country that is operating and continues to maintain adequate surveillance for Rabies and demonstrates an effective Rabies control Programme in human and animal populations. The occurrence of cases caused by Rabies variants other than canine Rabies should not preclude validation of reaching zero human Rabies deaths or verification of interrupting Rabies transmission.
2. Verify elimination of dog-mediated Rabies, i.e., interrupting Rabies transmission, defined as the absence of dog-mediated Rabies cases for a period of at least 24 months in the presence of high-quality surveillance according to international standards.
3. Be declared Rabies-free, which follows from verification, and recognizes countries or areas that are free of both dog Rabies and terrestrial Rabies. These definitions aim to assist public health authorities in assessing the risk for contracting Rabies after contact with animals. They differ from the current OIE definition of Rabies-free countries for the purpose of animal movement.

## 4.2 A country or area that is free of terrestrial Rabies is one in which:

1. No case of indigenously acquired infection due to dog mediated RABV has been confirmed in humans, dogs or cats or any other animal species at any time during the previous 24 months.
2. Any autochthonous positive case was shown by molecular characterization and epidemiological investigation to be a spillover from wildlife. If an imported case in carnivores is confirmed, the status of the country or area shall not be affected if molecular characterization confirms the non-indigenous source of the virus, and epidemiological tracing backward and forward reveals no evidence of secondary dog infection.

If an imported case is confirmed, the status of the country or area shall not be affected if a risk assessment and/or molecular characterization confirms the nonindigenous source of the virus and epidemiological tracing backwards and forwards reveals no evidence of secondary infections in any wild or domestic carnivore. Laboratory-confirmed infection in some wild animals (e.g., mongooses) should be considered an indicator of the presence and circulation of Rabies.

### 4.3 Core elements of validation, verification, and rabies-freedom

As per WHO, measures to validate rabies freedom must be underpinned by robust evidence and data that can be assessed independently, as premature cessation of control could result in the resurgence of the disease, with major public health, economic and political ramifications.

The core requirements for validation, verification and rabies-freedom are as follows.

- Rabies in all animal species and humans is notifiable.
- Continuous, effective surveillance is in operation and meets WHO and OIE standards for surveillance and diagnostic testing as per national guidelines.
- Adequate, targeted sampling is performed among the main susceptible domestic and wild animal species throughout the country.
- A national rabies control strategy (with mass dog vaccination and access to human PEP) has been effective in controlling rabies.
- Measures to prevent the importation of rabies-infected animals are in place as per OIE international standards and OIE Terrestrial Animal Health Code.

#### A. Validation of zero human deaths from Rabies

##### Indicator: Absence of human deaths from Rabies for 24 months

For a country to be recognized internationally as having eliminated Rabies as a public health problem, with zero human deaths over 24 months, Rabies must be notifiable in humans and animals, and the country must provide evidence of:

- a) An effective national Rabies control and elimination strategy.
- b) Decrease in the number of dog Rabies cases due to implementation of the national Rabies control and elimination strategy.
- c) A decrease in the number of human deaths from Rabies due to implementation of the national Rabies control and elimination strategy.

If a country has verified interruption of transmission of dog-mediated Rabies (see below), it will be considered also to have validated the elimination of Rabies as a public health problem.

#### B. Verification of interruption of Rabies transmission

The following is proposed as a means of verifying the interruption of Rabies transmission; however, the requirements for verification remain under discussion.

##### Indicator: Absence of dog-mediated Rabies cases for 24 months

For a country to be recognized internationally as having eliminated dog mediated Rabies, Rabies must be notifiable in humans and animals, the country should be able to document the absence of dog-mediated Rabies cases (i.e., the absence of animal cases due to a canine RABV variant) for at least 24 months and provide evidence of a post-elimination strategy or contingency plan that covers access to dog vaccine and PEP, procedures for surveillance and epidemiological investigation of any introduction of Rabies from other countries or regions:

- a) that the decrease in the number of cases of dog-mediated animal Rabies to zero is due to implementation of the national Rabies elimination strategy; and
- b) maintenance of zero dog-mediated human Rabies cases.

Given the time required for verification, countries are recommended to first self-declare freedom from dog-mediated Rabies, according to OIE procedures. The documentation required for an OIE self-declaration will subsequently be taken into consideration and reviewed to verify that Rabies transmission has been interrupted.

## 4.4 OIE Provision's:

OIE criteria for declaration of Rabies-free status are set for the purposes of animal health, international trade and movement of animals. To declare Rabies free territory or zones, guidelines have been prescribed by Terrestrial Animal Health Code (8.14) published by OIE as under:

According to OIE Terrestrial code article 8.14.2., a country or zone will be considered free from *infection* with Rabies virus when the following criteria are fulfilled:

4.4.1 It has a record of regular and prompt animal disease reporting *infection* with Rabies virus is a *notifiable disease* in the entire country and any change in the epidemiological situation or relevant events are reported.

- All susceptible animals showing clinical signs suggestive of Rabies are subjected to appropriate field and laboratory investigations.
- An ongoing system of *surveillance* has been in place for the past 24 months, with a minimum requirement being an *early warning system* to ensure investigation and reporting of animals suspected of being infected.
- Regulatory measures for the prevention of *infection* with the Rabies virus are implemented.
- No *case* of indigenously acquired *infection* with Rabies virus has been confirmed during the past 24 months.
- If an imported *case* is confirmed outside a *quarantine station*, epidemiological investigations have ruled out the possibility of secondary *cases*.
- Preventive vaccination of animals does not affect the free status.
- An imported human case of Rabies does not affect the free status.

According to OIE Terrestrial code article 8.14.4, a country or zone will be considered as free from dog-mediated Rabies when the following criteria are fulfilled:

- It has a record of a regular and prompt animal disease reporting system.
- Dog-mediated Rabies is a *notifiable disease* in the entire country and any change in the epidemiological situation or relevant events are reported.
- An ongoing system of *surveillance* has been in place for the past 24 months, with a minimum requirement being an *early warning system* to ensure investigation and reporting of animals suspected of *infection* with the Rabies virus.
- Regulatory measures for the prevention of *infection* with the Rabies virus are implemented.
- No *case* of indigenously acquired dog-mediated Rabies has occurred during the past 24 months.
- A dog population control programme has been implemented and maintained.

The following do not affect the status of a country or *zone* free from dog-mediated Rabies:

- Preventive vaccination.
- Presence of Rabies virus in wild animals.
- Imported human cases of Rabies.

Imported cases outside quarantine stations whenever epidemiological investigations have ruled out the possibility of secondary cases.

*For India, the NAPRE envisages to formulate detailed Standard Operating Procedures and technical guidelines for declaring any area as rabies control led rabies eliminated. These SOPs will be developed conforming to the international standards and will involve step wise verification process and detailed post elimination strategic plan for specific geographical/administrative unit in the country*

## 5

# Rabies Status in India: A Journey from neglected tropical disease to a Priority Zoonoses

As Rabies is a zoonotic disease, its prevention and control largely depends on multi-sectoral collaboration wherein not only the role of health sectors is required but the role of veterinary and wildlife sector sectors is also very important. For years Rabies remained a neglected disease but with the phasing out of Nerve Tissue Vaccine in 2006, Rabies prevention and control efforts gained momentum in India. National Centre for Disease Control, which is WHO Collaborating Centre for Rabies epidemiology, played an important role in sensitization of all stakeholders to make Rabies a priority Zoonosis. The efforts undertaken by the various sectors are briefly described as under:

## 5.1 Efforts undertaken in Human Health Sector: -

1. Control of Human Rabies – Pilot Project: In the 11<sup>th</sup> Five-year Plan, the Ministry of Health and Family Welfare, GoI approved a pilot project on the prevention and control of human Rabies. The project was implemented by NCDC in 5 cities Delhi, Ahmedabad, Pune, Bangalore and Madurai and the project began in January 2008 and continued till 2012.
2. With the lessons learned in the pilot, the Ministry of Health and Family Welfare approved National Rabies Control Programme (NRCP) in the 12<sup>th</sup> Five Year Plan for roll out in the entire country. During the 12<sup>th</sup> Five-year Plan, from 2014 to 2017, a small pilot was also taken to test the strategy of Animal Health Component in *Haryana and Chennai* through the Animal Welfare Board of India (AWBI) under the aegis MoEF&CC, GoI.

*National Centre for Disease Control is a designated WHO Collaborating Centers for Rabies Epidemiology and actively participating in all WHO technical consultation for rabies from time to time*

In the 12<sup>th</sup> five year plan, the objectives of the National Rabies Control Program were to prevent human deaths due to Rabies by capacity building, advocacy for scaling up inoculation of anti-rabies vaccine by ID route for Rabies and PEP, increasing awareness in the general community, strengthening surveillance of animal bites and Rabies cases and strengthening Rabies diagnostics and intersectoral coordination. The program is being continued with an expanded vision & goal of elimination of Human Rabies by 2030 with dedicated financial and technical support to the State Governments.

Following activities are being undertaken in the program-

- a. Advocacy for maintenance of a regular uninterrupted supply of Anti Rabies Vaccine (ARV) and Anti Rabies Serum (ARS) up to PHC level for timely Anti Rabies PEP for all Animal bite victims and utilization of funds available under NFDI for procurement of ARV and ARS.
- b. Establishment of Model Anti Rabies Clinics at District Level.
- c. Training on appropriate Animal bite management, prevention and Control of Rabies, Surveillance and Intersectoral coordination.
- d. Strengthening Surveillance of Animal Bites and Rabies deaths reporting.
- e. Creating Awareness about Rabies prevention.



- f. Strengthening inter-sectoral coordination with veterinary, municipal corporation and Panchayat Raj Institutions.
- g. Support to the states under NHM for states and district level operationalization of the program activities as envisaged under NAPRE.

With continuous advocacy, technical and financial support the program is gradually achieving the target of sensitizing the State Governments especially the health sector to prioritize Rabies and strengthen the facilities for the management of Animal Bite Victims. The program has been able to sensitize the veterinary stakeholders to recognize canine Rabies as an important public health problem.

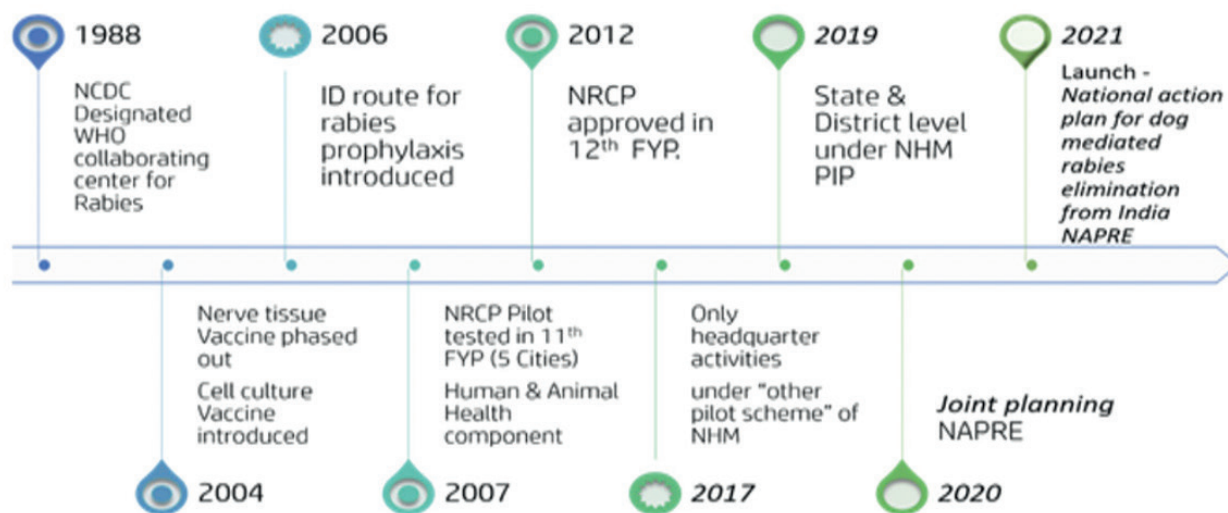


Figure 10 Milestones for National Rabies Control Program, GoI

## 5.2 Efforts undertaken in the Veterinary sector-

- a. Department of Animal Husbandry, Dairying under Ministry of Fisheries, Animal Husbandry and Dairying initiated a scheme 'Assistance to States for Animal Diseases (ASCAD)' in 2003-04, There is provision for providing Grants-In-Aid to the State Governments for anti-Rabies vaccination, strengthening of State Biological Production Centers and State disease diagnostic Labs, training of veterinarians & para-veterinarians, workshop, surveillance and monitoring of animal diseases, mass awareness program and cold chain maintenance under the central schemes of ASCAD and 'Rashtriya Krishi Vikash Yojana' (RKVY).
- b. Under, 'The Prevention & Control of Infectious and Contagious Diseases in Animals Act, 2009', animal Rabies is already a notifiable disease in India.
- c. The Animal Welfare Board of India (AWBI) also has a separate scheme for Birth Control and Immunization of Stray Dogs under which registered NGOs and civic bodies are funded for mass dog anti Rabies vaccination and stray dog sterilization.
- d. The Department of Animal Husbandry & Dairying has recently issued an advisory on control and eradication of Dog mediated Rabies deaths in Human to all State Animal Husbandry Department and working on the inclusion of companion animals (dog & cat) under the ambit of the Department of Animal Husbandry.
- e. Different State & UT Governments like Kerala and Goa are taking up schemes/initiatives for Rabies elimination in collaboration with notable NGOs.
- f. World Organization for Animal Health (OIE) has recognized the Rabies Diagnostic Laboratory, Department of Veterinary Microbiology, Veterinary College, KVAFSU, Hebbal, Bengaluru as a twinning partner with the Animal and Plant Health Agency (APHA), Surrey, United Kingdom and Centers for Disease Control and Prevention (CDC), Atlanta, GA, the USA for the purpose of supporting the project on 'Strengthening laboratory diagnosis of Rabies in India'. OIE has also recognized the laboratory as an OIE Rabies Reference laboratory in 2020.

### **5.3 Efforts undertaken in Wildlife Sector-**

National Tiger conservation authority of India, under the Ministry of Environment, Forest and Climate Change published a Standard Operating Procedure (SOP) to deal with emergencies arising due to stray & feral dogs in Tiger reserves in December 2020

### **5.4 Efforts undertaken by the Municipal Corporations –**

In the urban areas, municipal corporations undertake stray dog management according to the 'Animal Birth Control (Dogs) Rules', 2001. The Municipal Council dog-squad picks up unsterilized dogs (males and females), which are then neutered/sterilized, vaccinated with the anti-Rabies vaccine, and returned to their locality after 2 - 4 days. The right ear of the dog is clipped to indicate that it is sterilized.

### **5.5 Efforts by Non-Government Organizations and Private sectors -**

Several NGOs and Animal Welfare organizations are undertaking dog population management and vaccination programs and thus playing an important role in the fight against Rabies. Veterinarians across the state in urban areas conduct awareness shows, vaccination programmes in coordination with NGOs.

Professional organizations such as IMA, IAP, IVA, IVP, IAPSM, IAE, APCRI and Consortium against Rabies are also contributing to sensitizations and capacity building of the health care professionals in Rabies.



# 6

## Legislations & Public Health Laws

There are many important legislations, Public Health laws and provisions that are relevant to control and finally the elimination of Rabies. These legislations are implemented by different stakeholders. Important legislations are as follows:

### 6.1 The Prevention & Control of Infectious and Contagious Diseases in Animals Act, 2009<sup>14</sup>:

An Act to provide for the prevention, control and eradication of infectious and contagious diseases affecting animals, for prevention of outbreak or spreading of such diseases from one State to another, and to meet the international obligations of India for facilitating import and export of animals and animal products and for matters connected therewith or incidental thereto.

Rabies is a schedule\* disease, under [See sections 2 (o) and 38], under (a), at no 15.

*(As per chapter I, definitions at no 2, “scheduled disease” means any disease included in the Schedule).*

Under chapter 1, Control of scheduled diseases, at no 4 of Reporting scheduled diseases obligatory. — (1) \*

*(\*Every owner, or any other person, non-governmental organization, public bodies, or the village panchayat, in charge of any animal which he or it has reason to believe to be infective of a scheduled disease shall report the fact to the Village Officer or village panchayat in-charge, who may report the same in writing to the nearest available Veterinarian).*

### 6.2 The protection of Human Right Act, 1993-

In terms of Section 2 of the Protection of Human Rights Act, 1993 (hereafter referred to as ‘the Act’), “human rights” means the rights relating to life, liberty, equality and dignity of the individual guaranteed under the Constitution or embodied in the International Covenants and enforceable by courts in India. “International Covenants” means the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights adopted by the General Assembly of the United Nations on the 16th December, 1966.

*(Source-<https://nhrc.nic.in/faqs/how-are-human-rights-defined-protection-human-rights-act-1993>)*

### 6.3 Municipality Act

(Note-This act may vary among different civic bodies)

E.g. under the Delhi Municipal Corporation Act, 1957<sup>14</sup>,

Chapter I, 3991a ,1b, 1c, 1d states “Registration and control of dog”

Chapter 1, 399(2)-The Commissioner may

- (1) *cause to be destroyed, or to be confined for such period as he may direct, any dog or other animal which is, or is, reasonably suspected to be, suffering from Rabies, or which has been bitten by any dog or other animal suffering or suspected to be suffering from Rabies.*

- (2) *by public notice direct that, after such date as may be specified in the notice, dogs which are without collars or without marks distinguishing them as private property and are found straying on the streets or beyond the enclosures of the houses of their owners, if any, may be destroyed and cause them to be destroyed accordingly.*
- (3) *No damages shall be payable in respect of any dog or other animal destroyed or otherwise disposed of under this section.*
- (4) *No one, being the owner or person in charge of any dog, shall allow it to be at large in any public street or public place without being muzzled and without being secured by a chain lead in any case in which:*
  - (a) *he knows that the dog is likely to annoy or intimidate any person, or*
  - (b) *the Commissioner has, by public notice during the prevalence of Rabies, directed that dog shall not be at large without muzzles and chain leads.*
- (5) *No one shall:*
  - (a) *allow any ferocious dog which belong to him or is in his charge to be at large without being muzzled, or*
  - (b) *set on or urge any dog or other animal to attack, worry or intimidate any person; or*
  - (c) *knowing or having reason to believe that any dog or animal belonging to him or in his charge has been bitten by an animal suffering or reasonably suspected to be suffering from Rabies, fail or neglect to give immediate information of the fact to the Commissioner or give information which is false.*

#### **6.4 The Epidemic disease act, 1897, The Act No. 3 OF 1897<sup>16</sup>**

**Purpose:** - An Act to provide for the better prevention of the spread of Dangerous Epidemic Diseases.

#### **6.5 Prevention of Animal Cruelty Act- 1960' and the 'Animal Birth Control (Dogs) Rules', 2001**

**Purpose:-** 'Animal Birth Control (Dogs) Rules', 2001, is created under the 'Prevention of Animal Cruelty Act 1960' prescribing humane methodology for street dog population management, ensuring Rabies eradication, and reduction in man–dog conflicts.

#### **6.6 The Public Liability Insurance Act, 1991**

**Purpose:-** Act to provide for public liability insurance to provided immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto<sup>17</sup>.

#### **6.7 The Clinical Establishments (Registration and Regulation) Act, 2010**

**Purpose:-** This Act has been enacted by the Central Government to provide for registration and regulation of all clinical establishments in the country with a view to prescribe the minimum standards of facilities and services provided by them.

As per this law, the hospital shall maintain health information and statistics in respect of national programmes, notifiable diseases and emergencies/ disasters/epidemics and furnish the same to the district authorities in the prescribed formats and frequency.

#### *Disclaimer*

*All the acts identified in this Chapter are published in the Indian gazette. These acts could be referred to when dealing with man-animal conflict, Human right situations, administrative duties etc., we have viewed these laws in reference for the purpose of NAPRE. For further details, the acts are to be reviewed from official government websites.*

# 7

## One Health Approach for Rabies Elimination

One Health is a collaborative, multisectoral, and transdisciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment.

Rabies is a classic ‘One Health’ challenge: more than 96% of human Rabies deaths arise from exposure to a rabid dog. Standard animal vaccines for providing pre-exposure prophylaxis to dogs and human vaccines for providing optimum post-exposure prophylaxis to dog bite victims are available. However, imperfect awareness compounded by variable accessibility of PEP has resulted in the persistence of human Rabies fatalities. Rabies is a typical example of a zoonotic infection that does not fit into the domain of anyone single department having the responsibility of controlling Rabies. Although there is an animal reservoir involved, mortality and morbidity mainly affect human beings. Therefore, for prevention, control and elimination of Rabies an effective and concerted effort from the Animal Husbandry sector, Human Health sector, Local governing bodies, communities and other stakeholders, is the need of the hour.

Until now, Rabies elimination efforts have been fragmented and uncoordinated across various sectors. In 2015, The WHO/FAO/OIE declared a vision for the elimination of dog-mediated Rabies in 2030 and called for action by setting a global goal of zero human dog-mediated Rabies deaths by 2030, worldwide and thereby contributing as part of the SDG 2.

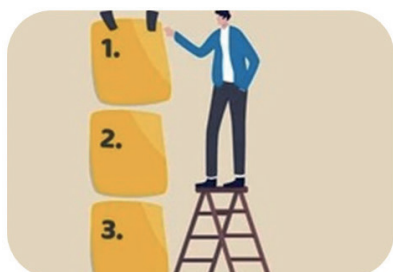
As Rabies disproportionately affects poor and rural communities, eliminating human deaths from Rabies is also consistent with SDG 1 to “end poverty in all its forms” and the commitment of Member States to “leave no one behind”.

The One Health approach is the most successful model which has been adopted by many countries for Rabies elimination. The target for Rabies elimination can only be achieved by sustained and synergistic political commitment and administrative support of all stakeholders from the highest level up to the village level. One Health Approach is the globally acknowledged means and a rational way of solving complex issues and challenges by harnessing the expertise of concerned stakeholders across the sectors. The Rabies prevention and control by “One Health Approach” is also challenging in the Indian Context due to varied administrative structure and priorities across sectors involved at the National and sub-national level. The key challenges for realizing One Health in the context of Rabies are as under:

1. Lack of understanding about One Health Concept in the concerned stakeholders.
2. The priorities are different for different sectors and accordingly poor and inadequate resource allocation for undertaking activities and to achieve the target.
3. Fragmented activities of animal health components such as dog population management and mass dog vaccination across the sectors.
4. Poor surveillance, reporting of human and animal rabies cases and lack of structured mechanism of data sharing across human and veterinary sectors.
5. Large Stray dog population both in urban, peri-urban and rural areas.

6. Biodiversity and challenging wild life sector at urban, peri-urban and rural interface resulting in spill over.
7. Limited logistics and poor supply chain management for undertaking the activities of Human and animal health components.
8. Lack of awareness among professionals as well general communities about the legal framework.
9. Lack of administrative and political will.

The National Action Plan for Dog Mediated Rabies Elimination is based on One Health Vision and clearly spells out the role and responsibilities of all the stakeholders at all levels to address the above list of challenges.



Priorities are different for different sector.



Large stray dog population



Biodiversity and challenging wildlife sector – urban- peri urban –rural and wildlife interface



Limited logistics



Human Health and Animal Health is a state subject.



Lack of Political will

**Figure 11 Challenges for realizing One Health Approach for Rabies Elimination**

# 8

## National Action Plan for Dog mediated Rabies Elimination from India

### 8.1 Approach for Rabies Elimination:

The National Action Plan for dog-mediated Rabies Elimination in India is conceptualized after wider consultation across the stakeholders, lessons learned from the ongoing activities in the country and is based on recommendations of various international agencies such as WHO, OIE, and GARC. The successful implementation of NAPRE is based on 5 major pillars.



Figure 12 Major pillars of NAPRE

NAPRE provides a broad framework for combating Rabies. It is a guidance document for the states/ stakeholders to develop their action plan, specific to their needs.

### 8.2 Vision and mission of the NAPRE

**Vision:** To achieve zero human deaths due to dog-mediated Rabies by 2030.

**Mission:** To progressively reduce and ultimately eliminate human Rabies in India through sustained, mass dog vaccination and appropriate post-exposure treatment.

### 8.3 Key Principles of NAPRE

The National Action Plan for Rabies Elimination (dog mediated) in India NAPRE is based on the following three key principles:

**Prevention:** Introduce cost-effective public health intervention techniques to improve accessibility, affordability, and availability of post-exposure prophylaxis to all people in need.

**Promotion:** Improve understanding of Rabies through advocacy, awareness, education and operational research.

**Partnership:** Provide coordinated support for the anti-Rabies drive with the involvement of community, urban and rural civil society, government, private sectors and international partners.

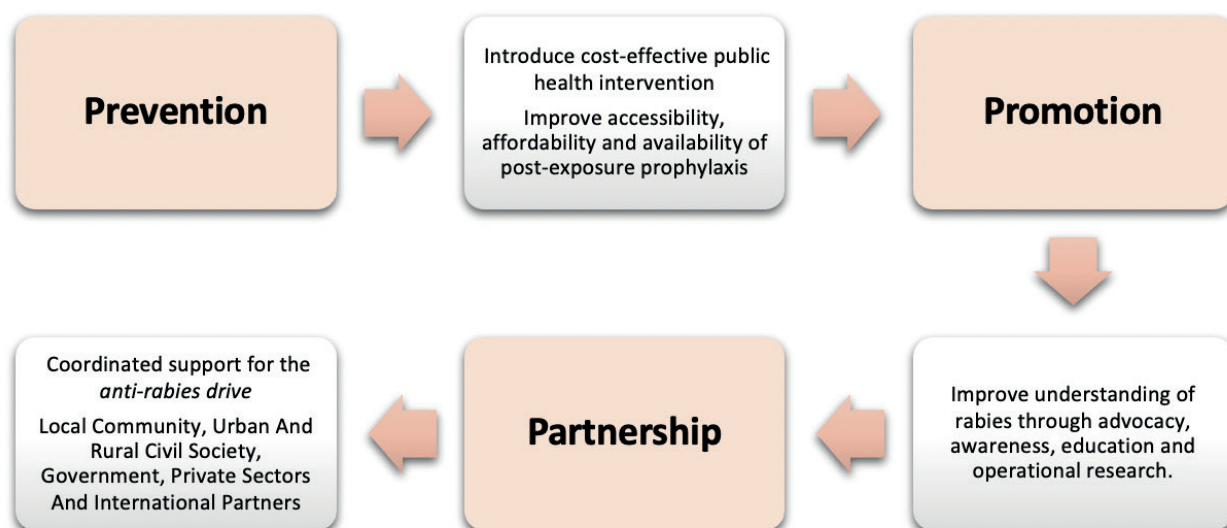


Figure 13 Key principles for NAPRE

## 8.4 Core Components of NAPRE

The National Action Plan Rabies Elimination will have two Core components to achieve the Elimination of Dog Mediated Human Rabies:

### A. Human health component:

To prevent human deaths due to Rabies by ensuring timely access for post-exposure prophylaxis for all animal bite victims and creating well responsive Public Health System.

### B. Animal health component:

To achieve at least 70 % Anti Rabies vaccination coverage among dogs in a defined geographical area annually for 3 consecutive years.

## 8.5 Strategies for the NAPRE

The strategies of both human and animal health components are described as under:

### 8.5.1 Strategies of Human health component of NAPRE:

The key strategic actions to achieve the objective of the human health component are as under

#### A. To Ensure availability of Anti Rabies Vaccine (ARV) and Anti Rabies Serum (ARS) to all Animal Bite Victims at all levels of health facilities

- To advocate the states for utilization of cost-effective Intra-dermal Rabies vaccines for Rabies Post Exposure Prophylaxis by organizing Sensitization workshops for stakeholders at national/ regional level for shifting IM to ID route – sensitization of health professional both in government and private sectors to routinely practice ID route instead of IM route for Rabies prophylaxis.
- Financial assistance to states from Centre through earmarking funds for ARV/ARS procurement in National Free Drugs Initiative scheme and inclusion of ARV/ARS in Essential drug list at all levels.
- Strengthening infrastructures for treating the victims of animal bites- by establishing Model Anti Rabies Clinics.



- Ensuring availability of trained manpower concerning appropriate animal bite management/ID inoculation/ ARS infiltration.
- Ensure uninterrupted supply of ARV/ARS and close monitoring ARV/ARS demand and supply positions to avoid stock out positions ( **Annexure 5** - guidance document).
- Ensuring and upgrading adequate cold chain facilities to store ARV/ARS stocks at appropriate levels.
- Establishing monitoring mechanism for recording and reporting of Adverse Event Following Immunization (AEFI) for Rabies.

#### **B. Capacity building of professionals in appropriate animal bite management**

- Training of health professionals and paramedical on Rabies pre & post-exposure prophylaxis as per National Guidelines.
- Training of State, district and below District level health care professionals on program management aspects.
- Joint training of Health and Veterinary professionals on the operational aspect of the Rabies Elimination plan.
- Training and capacity building of laboratory professionals on Rabies diagnostics.
- Training on Surveillance of Animal Bites and Rabies Case investigations and Notification.

#### **C. To encourage pre-exposure prophylaxis for High-Risk Groups**

- Sensitization of professionals and formulation of protocols for the safety of health workers/professionals exposed to an environment conducive for Rabies virus transmission.
- Promoting pre-exposure prophylaxis among children through involvement of the Indian Academy of Pediatrics as Rabies is an optional vaccine in IAP Schedule.

#### **D. Strengthening Surveillance of animal bites and Rabies cases in human**

- Ensuring implementation of Rabies notification in Human health sectors through the web portal for notification of animal bite victims/Rabies cases.
- Strengthening periodic reporting system about animal bites and Rabies incidence through IDSP and IHIP.
- Resource mapping – mapping the facilities (State/ District wise) for management of Animal bite victims, Treatment facilities for suspected Rabies cases or Infectious Diseases hospitals and mapping of laboratories for Rabies diagnostic.
- Establishing Sentinel surveillance system for animal bite cases through Model Anti Rabies Clinics.

#### **E. To strengthen diagnostics capacity on Rabies**

- To identify and establish Rabies referral laboratories at the National, regional, and State level in the State government medical colleges, Infectious disease hospitals or tertiary care hospitals as per the need of the program. These labs will provide the recommended ante mortem and post mortem diagnostic facilities such as Directs Fluorescent Antibody test/ Sellers Stain/ Molecular Diagnosis by PCR and ELISA.
- To identify and establish at least one laboratory at the district level-(District Public Health Laboratory under IDSP)- To do Anti-Rabies Antibody titre estimation by ELISA.
- Training and capacity building of lab professionals (National / State level Training workshop) by periodic and hands-on training on Rabies diagnostics.

#### **F. To promote Operational research in the Rabies**

- To estimate Rabies burden and incidences of Animal bites.
- Estimations of coverage of ARV and ARS among animal bite victims, compliance and dropout rate of the vaccination, and AEFI if any.
- Study to examine the operational feasibility and effectiveness for the modified regimen for Rabies post exposure prophylaxis.
- To study the health-seeking behaviors of the community and reasons for the dropout.

- Mapping of Rabies biological supply chain and market landscape.

**G. To strengthen Intersectoral Coordination mechanism between the Veterinary and Medical sectors for regular sharing of reports/ data on animal Rabies and set up guidelines for joint responses for Rabies outbreaks.**

- Joint Training/Sensitization workshop of District level Medical/ Veterinary Department on Rabies and Joint gap analysis for formulation of Action Plan for Rabies Elimination.
- Framing of standard guidelines and SOPs w.r.t roles and responsibilities of Veterinary/Medical sectors in the event of Rabies outbreaks (reported clustering of cases among dogs and humans).

**H. Information Education and communication (IEC) for increasing awareness about the diseases and the importance of seeking timely and appropriate treatment for animal bites**

- Development of IEC material for undertaking IEC activities (Print/ Electronic material- audio visual spots for a mass media campaign).
- Framing of definitive IEC Strategy/ guidelines for the identified target audience (Health professional/ Veterinary professionals/ Children-school health education / Community or field workers (ASHA/ ANMs and Paravets/ General Community/ Media.
- Including IEC especially in schools.

**I. Public-Private Partnership through Involvement of NGO and community organizations.**

- Advocacy for the participation of private institutes/ NGOs/ Community organizations in the efforts towards Rabies.
- Coordination of private/ community organizations/ NGOs.

## 8.5.2 Strategies for Animal Health Components:

**A. Estimation of Canine Population –**

- To obtain data on the number of strays (Free roaming dogs), community owned dog and pet dogs to be vaccinated & to calculate the logistics requirement (Money, Manpower and material).
- community Owned dogs (dogs that are fed by certain communities but are roaming freely), stray dogs (unowned dogs and free roaming).
- Various practical tools are available including Livestock Census 2012, Dog registration register, population estimates.
- For a more accurate population count, Dog Population estimation can be done as per the Standard Operating Procedure at **Annexure 6**.

**B. Identification of Rabies risk zone**

- India has a large population of stray dogs and vaccination of the entire canine population is a resource-intensive procedure. Therefore, with the limited resources it is prudent to initially identify the Rabies risk zone for prioritizing Rabies elimination activities in these areas as planned under NAPRE.
- The veterinary department in coordination with the health department will identify High risk, medium risk and low-risk zones at the village, block and District's level based on the epidemiological data of Rabies (number of human and animal Rabies cases), number of dog bites, sharing of the border with neighboring high risk/medium risk areas.
- The Rabies risk zone identification for prioritizing activities of Animal Health Component may be done as per technical evidence and data available in both sectors. These zones may be reviewed every year for current category status.

**C. Planning & implementing strategic mass dog vaccination programme –**

- The objective of the strategic mass dog vaccination programme is to achieve anti Rabies vaccination in at least 70 % of the dog population, annually for three consecutive years and maintain the 70 % vaccination status in a defined geographic area. This mean, vaccinations have to be conducted in 70



% of dogs every year for 3 years to provide adequate protective 'herd immunity' in that population. If at least 70% vaccination coverage is maintained every year, Rabies would be eliminated from the defined dog population. Then for 5-8 years to eliminate Rabies in an area or region.

- Mass Dog Vaccination (MDV) against Rabies could also be prioritized in the areas where Mass ABC Surgeries have been undertaken before. Dogs that have been sterilized previously should also be revaccinated to maintain anti-Rabies immunity in the dog population.
- Intensive vaccination campaigns lasting from 1 day to 1 month are effective in Rabies control. Vaccination Campaigns must reach at least 70% of the dog population of the selected area.
- The vaccination coverage should not be compromised in pursuit of speed.
- The Department of Animal Husbandry in coordination with Municipal cooperation, Panchayati institution and NGOs has to take the lead in strategic mass dog vaccination campaigns and ensure availability of Anti Rabies Vaccine (ARV) at all levels of animal health facilities.
- Private veterinary practitioners, veterinary students can be involved to assist in such MDV drives.
- The MDV can be done as per the Standard Operating Procedure at **Annexure 7**.

#### **D. Assessment of Post vaccination coverage-**

- To assess the success of mass dog vaccination it is essential to conduct sero-monitoring of the vaccinated dog population.
- A survey should be undertaken within one week of the MDV campaign in the vaccinated areas to assess the numbers of marked /unmarked dogs, and conduct proportional counts (count the number of dogs with color mark) and also by using a questionnaire survey of the household.
- A revaccination campaign should be organized if the coverage is found to be below 70% of the estimated dog population.
- The details of animals vaccinated in the field could be reported using the Monthly Animal Health Report Form to the local authority.
- The local authority then can issue a completed mass vaccination certificate to the village/block/district.
- The Post vaccination coverage can be done as per the Standard Operating Procedure at **Annexure 8**.
- Reporting format for Mass dog vaccinations by the Block, district and state level is at **Annexure 9**.

#### **E. Dog Population Management (DPM)**

- Dog population management -to limit the man-dog conflict and to reduce the numbers of stray dogs to an acceptable level through Animal Birth Control (ABC).
- To establish a strategic robust Dog population Management.
- It is desirable that the state veterinary sector coordinate with the stakeholders involved in DPM such as Local Governing Bodies, NGOs, and AWBI.
- Creation of dedicated Animal Welfare Para-Police/Animal Law Enforcement Agency
- A permanent, dedicated Manpower for Animal Birth Control and Anti-Rabies Vaccination Programme could be used.
- The Concept of Community dogs should be included, and AWOs should be identified as Care-takers for their Sterilization and Vaccination.
- The services of AWOs will be utilized constructively for prevention and control of rabies in their jurisdiction area wherever possible local governments they can take assistance in social mobilization, general awareness and rescue operations for undertaking the MDV & DPM.
- Vet colleges could be involved in the DPM programmes.

#### **F. To promote responsible dog ownership**

- Promoting responsible dog ownership and encouraging neutering/sterilization of pet animals is important to make the community understand the cohabitation, behavior, ecology, basic needs of dogs.
- This should include advocacy and ensuring that pet dogs or community owned dogs are properly vaccinated and treated against diseases. Advocacy among the community about preventing dog bites,

preventive vaccines and waste management.

- Advocacy to promote the registration of pet dogs and also community owned dogs.

### **G. Solid waste management (SWM)**

- Proper solid waste management is important as domestic garbage/waste attracts stray dogs leading to an increase in population and incidences of dog bites. Environmental control of stray dogs is an effective strategy for DPM by reducing the access to food to the stray dogs by ensuring proper food waste disposal. The following two activities are important in SWM:
  - Identifying hotspots in the community where congregations of dogs are common.
  - Creating awareness among communities about waste management and its relation to the increase in the dog population.
  - While disposal of dead animal carcasses, the disposal should be done as per regulations provided in the Prevention and control of animal disease act 2009<sup>14</sup> , and Central Pollution Control Board Guidelines 2020<sup>18</sup>, section 393 of Indian penal code<sup>19</sup>.

### **H. Community involvement-**

- Building partnerships, social mobilization, and ensuring community participation are crucial for the success of the NAPRE.
- Community involvement in rural and urban areas is necessary for identifying problem areas, identifying bite victims, ensuring treatment compliance, effective vaccination camps, and responsible dog ownership and reduce human-dog conflict.
  - In urban areas- Resident Welfare Associations, Cooperative Societies (any societies registered under the Society Registration Act.
  - In rural areas- Gram Panchayats, & Gram Sabhas.
  - Collaboration among different departments, authorities, NGOs and medicos, veterinarians in private sectors will be required for the best utilization of the available resources.

### **I. Confinement and containment**

- As per the Prevention and Control of Infectious Disease Act, 2006, Rabies is a notifiable disease in animals. The state government should ensure that all the measures as per the Act should be followed in case of animal Rabies.
- Isolation wards must be created for Rabies Suspected Dogs / Animals by the veterinary sector (both animal husbandry department and Local governing bodies) and Provisions must be made for their maintenance of these facilities.
- Guidelines of AWBI be followed in deciding the fate of such suspected dogs/animals.

### **J. Operational research**

- Conduct research on Rabies about the host range, viruses circulating the country, and knowledge attitude practices and vaccine seeking behaviors, to estimate Rabies burden and incidences of Animal bites, coverage of ARV in animals, mapping of anti-Rabies biological supply chain and market landscape for animals.

# 9

## Stakeholders involved in NAPRE

The prevention, control and elimination of Rabies require an effective and concerted effort from all stakeholders. The stakeholders involved in the operationalization of NAPRE have been categorized as Key Stakeholders, Supporting Stakeholders and Private partners.

### 9.1 Key Stakeholders:

Key stakeholders will act as a nodal agency for the overall formulation, planning, coordination and implementation of the activities as envisaged under the National and State Action Plan of Rabies Elimination. They will be directly involved in providing technical and logistic support to the State/District and below level. They will also help in formalizing the State Action Plan for Dog mediated Elimination of Rabies. The key stakeholders identified are as under -

1. Ministry of Fisheries, Animal Husbandry Dairying at the Center and the State Animal Husbandry Department at the State and below level.
2. Human Health sector- Ministry of Health Family Welfare at the center, State Health Department at the state and below level.
3. Wild life and environment sector- Ministry of Environment, Forest Climate Change at the center, Forest Department at the state level and similar forest authorities at National Parks and notified zones.
4. Ministry of Agriculture and Farmers Welfare, Indian Council of Agriculture Research at the center.
5. Ministry of Housing and Urban Affairs at Centre and Urban Local Bodies at the District and Block level.
6. Ministry of Panchayati Raj at the Centre and Rural Local Bodies at Village level.

### 9.2 Supporting Stakeholders

Supporting stakeholders are those who would be assisting the key stakeholders in the coordination and implementation of various aspects of the NAPRE. They will provide technical assistance in activities planned for Rabies Elimination from India under various components. The supporting stakeholders identified are as under-

1. Ministry of Finance at the Centre and the State Department of Finance at State and below the state level.
2. Ministry of Human Resources Development at the Centre and the State Department of Human Resources Development at State and below the state level.
3. Ministry of Information and Broadcasting at the Centre and the State Department of Information and Broadcasting at State and below the state level.
4. Ministry of Science and Technology, Department of Biotechnology at the Centre.
5. Ministry of Drinking Water and Sanitation at the Centre and the State Department of Drinking Water & Sanitation at State and below the State level.
6. National Human Rights Commission.

### 9.3 Other Stakeholders

These stakeholders who would primarily assist in the implementation of technical aspects of the NAPRE with the available logistics and expertise available to them and providing support to the key stakeholders at the field level. Private partners fall into the following categories

1. Non-Government organization active in the field of Rabies in Health and Veterinary sectors.
2. Professional organizations and associations in the medical and veterinary sector.
3. International Development organizations and UN agencies.
4. Private hospitals, institutions, clinics, diagnostic labs both in the veterinary and health sectors.

### 9.4 Role of all the Stakeholders involved in Rabies control for implementation of NAPRE:

#### A. Role of Human Health Sector:

At the center, the Ministry of Health and Family Welfare, National Centre for Disease Control will be the key stakeholder and nodal agency for the overall planning, coordination and implementation of the human health component in the country. The state, district and below district level activities will be implemented through the existing health systems. The key role of the health sector under this NAPRE will be as under: -

- Advocacy with different stakeholders for prioritizing Rabies to achieve commitment at all levels so that resources could be mobilized for prevention and control of Rabies.
- Ensure accessibility and rapid availability of treatment of all animal bite victims and Rabies patients.
- Capacity Building and Training of health professionals in appropriate animal bite management and Rabies Prophylaxis at all levels.
- Production of standard IEC materials for wider circulation.
- Strengthening maintenance of a database on Rabies control program (e.g., vaccination coverage), analysis and sharing of information with other stakeholders.
- Strengthening Public-Private Partnership (PPP) through engagement with professional organizations such as IMA, IAP, and communities /organizations involved in the field of Rabies for undertaking research and other activities.
- Strengthening of Rabies diagnostic laboratories including the standardization of protocol for diagnosis to ensure uniformity across identified diagnostic laboratories in the country.
- Intersectoral coordination and sharing of information between the animal health, and wildlife health sector to facilitate better implementation.
- Regularly updating technical guidelines on Rabies.
- Regulation of Rabies sera and sera producing pharmaceuticals as per the Drugs and Cosmetics Act, 1940 and rules in vogue.
- Monitor and evaluate the Rabies control programs implemented by the field units.
- Coordinate and conduct operational research on Rabies in collaboration with national, international, diagnostic and research institutions.

#### B. Role of Veterinary Sector:

At the Centre, Ministry of Fishery, Animal Husbandry and Dairying, GOI will be the key stakeholder and nodal agency for technical guidance to the states for the activities planned under the animal health component. The program in the States will be implemented through the State Veterinary Department, Veterinary colleges, Municipalities, and Panchayati Raj Institutions. In this NAP, the role envisaged for the animal sector is as follows:

- Advocacy with different stakeholders for prioritizing animal Rabies to achieve commitment at all levels so that resources could be mobilized for the elimination of Rabies.
- Mapping of high risk, medium risk and low risk areas of Rabies in association with health department and other stakeholders to prioritizing areas for MDV and DPM.

- Ensure uninterrupted supply of logistics (money, manpower and material) for undertaking strategic mass vaccination and ring vaccinations activities for the areas targeted for Rabies elimination.
- Capacity building for Veterinary Professional, Paravets, dog catchers, post-vaccination survey staff and other allied personnel.
- Strengthening of Rabies diagnostic laboratories from the veterinary sector.
- To develop standard (IEC) materials for wider circulation.
- Intersectoral coordination and sharing of information on Rabies the health and wild life health sector to facilitate better implementation.
- To be part of joint investigations whenever there are human Rabies cases or increasing dog bite cases.
- Liaise with different stakeholders/agencies/international organizations (e.g., FAO, OIE, WHO, SAARC) for technical support on Rabies prevention and control.
- The possibility of linking the NADRS, NADRES to the IHIP portal for selected parameters is to be explored.
- Regularly publishing and updating technical guidelines on animal Rabies.
- Regulation of Rabies sera and sera producing pharmaceuticals as per the Drugs and Cosmetics act, 1940 and rules in vogue.
- Monitor and evaluate the control programs implemented by the field units.
- Coordinate and conduct operational research on Rabies in collaboration with national, international, diagnostic and research institutions.
- Establishment/strengthening of check-post/quarantine centers since unvaccinated as well as diseased animals can easily enter and introduce Rabies in areas where Rabies cases have reduced.
- To coordinate with the stakeholders involved in strategic DPM.
- Since, Veterinary council of India is responsible for making provisions for the regulation of veterinary practice and standards of veterinary education, Animal Rabies should be included as a priority disease in the curriculum of veterinary students in colleges.
- Veterinary Colleges & Veterinary Universities can incorporate training of veterinary students on MDV and Mass DPM as per AWBI norms.
- Increase the involvement of veterinary students in activities of MDV and MDPM during their routine internships.

### **C. Role of Wild Life Sectors**

Most of the forests are surrounded by villages and rural dwellings. This increases the risks of transmission at the Domestic-wild life interface hence collaboration between livestock and wildlife sectors (forestry) is equally important. In this NAP, the role envisaged are as follows: -

- Frame technical guidelines and monitoring framework for wild life Rabies.
- Identify animal Rabies endemic areas near National parks/conservation areas and forests.
- Undertake surveys in wild life reservoirs in captured and free-roaming wild animals.
- Capacity building of zoo personnel to handle wild life Rabies cases.
- Ensure pre-exposure prophylaxis for Rabies zoo's personnel, wildlife workers and animal handlers.
- Ensure pre-exposure prophylaxis Rabies vaccinations for zoo animals.
- Disseminate IEC for zoo and animal handlers/ zoo workers/ visitors.
- Sharing of Rabies disease outbreak information among wild animals to DAHD and Health sector.
- To undertake research on wildlife sentinels, transmission patterns, and spillovers of Rabies virus from wild animals to domestic animals.
- To undertake Active surveillance to identify the wildlife reservoirs for the Lyssa virus.
- To undertake a risk assessment in areas adjoining the forests, sanctuaries, and national parks.
- Predator-proof sheds for livestock should be made compulsory for those families who live near the WPA/Forest/Sanctuary to ensure no spillovers.

- Pre-exposure Rabies vaccination protocols should be done routinely for dogs and livestock living around Wildlife Protected Area (WPA)/Forest/Sanctuary.
- To undertake Proper disposal of animal carcasses near the WPA/Forest/Sanctuary.
- Collection of surveillance samples from wild animals in cases of suspected Rabies deaths.
- Implementation of three-four layered agro-forestry plantations should be adopted for the prevention of wildlife-domesticated animal conflict in the fringe area of villages and the fallow area near the WPA/Forest/Sanctuary.
- The Wildlife Sanctuaries / National Parks marked for the conservation of wild cats by NTCA, to consider the control of stray dog population and Anti Rabies Vaccination clubbed with other Mass Vaccination campaigns for Distemper & Parvo Virus.

#### **D Role of Ministry of Agriculture and Farmers Welfare,**

At the Centre, ICAR, in the Ministry of Agriculture and Farmers Welfare, GOI will be the nodal agency for coordinating, guiding and managing research and education in animal sciences with states for the research activities planned under the animal health component. In this NAP, the role envisaged for ICAR are as follows: -

- Framing technical guidelines, SOPs and monitoring framework on Rabies elimination.
- Coordinate and conduct operational research on Rabies in collaboration with National, International, Diagnostic and Research Institutions.
- Undertake community awareness programme in ICAR network of institute and KVKs.

#### **E Role of Animal Welfare Board of India:**

- To ensure implementation of Prevention of Cruelty to Animal Act, 1960 in coordination with the state government and local bodies.
- To work with the state veterinary department, and coordinate with the local governing bodies for developing a strategic Dog Population Management (DPM) plan as per the ABC Rule.
- Services and assistance of Animal Welfare Organizations can be utilized with respect to certain aspects of Dog Population Management and Mass dog vaccination drives; & isolation and observation of aggressive dogs suspected with rabies etc.
- The services of AWOs will be utilized constructively for prevention and control of rabies in their jurisdiction area wherever possible local governments can take assistance from AWOs in social mobilization, community awareness and rescue operations for undertaking the MDV & DPM.

#### **F Role of Urban and Rural Local Governing Bodies (LGB)-**

##### **(Municipal Corporation, Zilla Parishad, gram panchayat)**

As per the Panchayat raj Act and Municipality act, the local self-government, councils, and corporations are in charge of implementing the ABC programs. These acts are to be implemented as per the guidelines (e.g., guidelines for stray dog vaccinations, and dog population management). The activities envisaged for LGB are:

- Advocacy, Training, and capacity building of PRI members on prevention and control of Rabies in their village/ward.
- Gram Sabha to be convened immediately to inform the public regarding the incidence of Rabies and needs for various mitigation measures and legislation.
- Members can immediately Report to A.H, Health Dept. when an unusual incidence of dog bite or potentially Rabies case in their respective ward/village is noted.
- Members can ensure that human bite victim (exposed) gets proper (full dose) medical treatment.
- Provide a list of patients exposed to animal bites and the same be maintained in the respective ward/village and follow up measures to be done strictly.
- Monitor and strictly implement mass vaccinations campaign of dogs in their respective ward/Villages.
- Encourage pet dog registration in their wards/constituencies/villages.



- Resolution can be passed in Gram Sabha regarding restriction of movement of dogs in their respective ward and complete ban on importation/introduction of new dogs.
- Monitor pet owners and encourage them to register and vaccinate their pets.
- Monitor MDV and DPM plans undertaken by the concerned agency.
- Coordination with health and veterinary sectors for strategic Mass vaccination of stray dogs.
- Monitor solid waste management and garbage disposal areas in their wards and Identify problem areas of waste collection points and ensure proper waste management to prevent conglomeration of stray dogs in such areas.
- Information sharing on animal bites and Rabies cases to the local animal husbandry department, health department and local authority.
- To provide required logistics for undertaking DPM and Mass stray dog vaccinations such as dog pounds (ABC Center with Operation Theatre/ Mobile Clinic & Dog Kennels), Dog Vans & Logistic Support to run the program as per the ABC (Dogs) Rules, 2001.
- Monitoring of slaughterhouses and meat stalls with existing laws (Food Safety and Standards Authority of India, licensing, and Registration, 2011) and regular monitoring of waste generated from these units.
- To collect waste from vegetable, fruit, flower, meat, poultry, and fish market on a day-to-day basis and promote setting up of decentralized compost plant or bio-methanation plant at suitable locations in the markets or in the vicinity of markets ensuring hygienic conditions to accumulation of waste which would attract dogs (free-roaming dogs & community owned dogs).
- Special focus on preventing the disposal of animal carcasses in and around peripheral areas of villages, towns, cities and around forest areas so as to avoid easy availability of food for FRD and scavenging wild animals and further prevent the interactions between wildlife & domestic animals.

## **G Role of Ministry of Human Resource Development**

Children are most vulnerable to dog bites. It is therefore important to include Rabies in the formal education system at all levels.

- Prevention of Rabies and animal bite management incorporated in the school health program.
- Inclusion of the basic prevention and control measure for Rabies in the school curriculum in order to sensitize children and youth about the disease and measure to be undertaken in case of animal bites.
- Capacity building of teachers on first aid measures in the event of animal bites.
- To ensure that dogs in and around school premises are vaccinated.
- Conduct frequent education camps for creating awareness against Rabies.
- Include the observation of World Rabies Day every 28<sup>th</sup> of September in the school & college premises.
- Ensure proper waste management in school compounds to prevent access to garbage to free- roaming of owned dogs.

## **H Role of Ministry of Drinking Water and Sanitation and Ministry of Housing and Urban Affairs- Swachh Bharat Mission**

- At the central level, the Ministry of Housing and Urban Affairs is the nodal Ministry for the formulation of policies, strategies, guidelines and assists the States by providing financial assistance for the development of water supply and sanitation infrastructure in the cities and towns. Swachh Bharat Mission, an initiative of the Government of India has the objective of improving sanitation by eliminating open defecation, eradicating manual scavenging, managing municipal solid waste through modern and scientific techniques, generating awareness about sanitation. A viable linkage may be created by including various strategies used in the NAPRE within the ambit of the Smart Cities Mission of the Ministry of Housing and Urban Affairs. DPM can be undertaken under the aegis of the Urban Development Department vide support of various local bodies.
- LGB needs to explore the role of SBM regarding solid waste management as this would help in maintaining clean garbage areas and thus the stray dog population. SBM in rural areas is implemented by the Ministry of Drinking Water and Sanitation, and in urban areas by the Ministry of Housing and



Urban Affairs. The role of these ministries through the Swachh Bharat Mission is as under-

- Steps should be taken to exclude dogs from sources of food (e.g., rubbish dumps and abattoirs, and installing animal-proof rubbish containers).
- Swachh City Plans under SBM could consider including steps to install animal proof rubbish containers.
- Monitor solid waste management in their wards and identify problem areas of waste collection points and ensure proper waste management to prevent conglomeration of stray dogs in such areas.
- Community awareness and IECs on maintaining clean neighborhoods and how it corresponds to the dog population.
- Strict monitoring of waste generated from slaughterhouses and meat stalls with existing laws i.e. Food Safety and Standards Authority of India (FSSA Regulations) (licensing and Registration) 2011.
- To undertake training and capacity building of local bodies and other stakeholders.

### **I Role of Department of Biotechnology, Ministry of Science and Technology-**

Provide technical and any other support in operational research activities planned by the animal health, human health and all the other stakeholders identified under the NAPRE on Rabies and Lyssavirus in the Indian context.

### **J Role of Ministry of Finance**

The Ministry of Finance (MOF) should provide adequate fund for the implementation of NAPRE in the country. The adequate budget provision for Rabies prevention and dog population control should be made available at different levels to all stakeholders. MOF should provide contingency funds for Rabies outbreak containment in addition to routine prevention and control activities.

### **K Role of Private Partners, Non-Government Sectors, Professional medical, and Veterinary Organizations.**

The elimination of dog-mediated rabies envisages active participation of the Private and NGO sector. The key roles identified are as under-

- Develop a strong volunteer network for community engagement & mobilization.
- Promotion of Anti Rabies vaccination campaigns.
- Promote responsible pet ownership.
- Intensify Rabies awareness education and interpersonal communication campaign.
- Surveillance/reporting of suspected animal & human Rabies cases.
- Ensure animal bite management in humans and animals.

### **L Role of International organizations**

International organizations such as the World Organization for Animal Health (OIE), World Health Organization (WHO), Food and Agriculture Organization (FAO) and other organizations can provide technical support for implementing the strategic components of the NAPRE.

# 10

## Rabies Surveillance under the NAPRE

Surveillance is the process of systematic collection, collation, and analysis of data with prompt dissemination to those who need to know, for relevant action to be taken. A well-functioning disease surveillance system provides information for planning, implementation, monitoring and evaluation of public health intervention programmes.

The success of the Rabies control and elimination programme depends on effective an GIS-enabled surveillance system capable of capturing information about ongoing activities of human and animal health components and their impact on epidemiological trends of animal bites and Rabies deaths. Surveillance is a key element in NAPRE so that problems can be identified, and actions could be undertaken taken in a timely manner.

A dedicated portal and GIS-enabled electronic surveillance system would be developed for NAPRE for establishing a joint Rabies Surveillance Network and integrated data sharing mechanism for local, state, and central agencies for strategic responses for Rabies & animal bite cases. The portal would provide essential information on animal Rabies, human Rabies, dog bites, availability of Rabies vaccine & Immunoglobulins for the states and other partner organizations on real-time basis.

A dedicated surveillance system each for human and animal health components (veterinary and wildlife) with linkages at the appropriate level and systematic data sharing on the defined parameter is a prerequisite before targeting a geographical area for control and progressive elimination of Rabies. The surveillance system under NAPRE is described as under –

### 10.1 Components of the Surveillance Systems:

The surveillance system for human rabies and domestic / wildlife animal Rabies will have the following component.

**Table 4 Components of Surveillance Systems**

S No.	Components of Surveillance System	Human Rabies	Domestic /Wildlife Rabies
1	Priority Events / Data Parameters	Surveillance in Human Surveillance of Animal bites in Human, Surveillance of deaths due to Rabies (Suspected and Confirmed), Surveillance to estimate Coverage of ARV and ARS	Surveillance of Rabies in Animals- Clinical Surveillance- All animals (Livestock, Pet, stray and wild animals) having clinical signs of Rabies, or sudden deaths in animals due to unknown causes but not confirmed by Lab Laboratory -based surveillance – Death of animal confirmed by lab by- Virological Surveillance- The brain tissue samples from carcasses (especially dogs and cats) collected and subjected to rapid antigen detection test and FAT to find a Rabies case. Samples tested positive to FAT could be archived for molecular analysis and research purpose to identify the circulating virus in the region.

S No.	Components of Surveillance System	Human Rabies	Domestic /Wildlife Rabies
2	Disease Notification	Diseases Notification under "Epidemic Diseases Act"/ Clinical establishment act Public liability Insurance Act 1991 – By State Governments To provide immediate relief by accident / Animal bites The Protection of Human Right Act	Diseases Notification The Prevention & Control of Infectious and Contagious Diseases in Animals Act, 2009 Municipality Act- (This act varies from state to state.)
3	Data Nodes/ Data Generation points	For Animal bites and ARV / ARS coverage - Anti-Rabies clinic (ARC) Model ARCs/ Animal bite management facilities at PHC/ Block level to be sent to the District Hospitals/ Medical Colleges Pvt. Health Facilities	Block Veterinary Clinic District Veterinary Clinic, AWOs State AH Departments, State Veterinary Colleges, AH Dept. of Local Governments (Urban & rural) Pvt. Veterinary Clinics For Lab-based Surveillance; RDDL, SDDLs/ Regional Coordinator under NOHPPCZ, Laboratory undertaking Rabies diagnosis in State Veterinary Colleges under VRDL ICMR and DBT
4	Responsible officers	Village level- ASHA/ ANM/ AWW PHC- PHC MO Block- Block Level Medical Officer District- Designated District Nodal Officers, Nodal officer of ID Hospital / Tertiary care institutes State – SNO, NRCP National- NPO, NRCP	Village Level- Pashu Sakhi/ Pashu Mitra / AI officers / Forest guards /local volunteer network Block-level- Block Veterinary officer District- Designated District Nodal Officer / District Veterinary officer/ District Wildlife Warden /Director of National Park (Wildlife Sanctuary) State – Designated State Nodal Officer / State AHC / Chief Wildlife Warden National – Designated NPO at DADF The designated officer in the Wildlife department of MoEF&CC Designated Nodal Officer AWBI
5	Recording and Reporting Mechanism	All State Health Departments are advocated to use the standard recording and reporting formats at all health facilities providing Animal Bite Management facility as under Animal bite exposure register Rabies PEP card in duplicate (One for the animal bite victim and another for health facility record) Monthly reporting format for Health Facility Human Rabies case report form for Infectious Disease Hospital (ID hospital)/ other health facility Outbreak Investigation Form	All State Veterinary / Animal Husbandry Departments are advocated to use the standard recording and reporting formats at all Animal health facilities providing vet services as under- Reporting format for Suspected Rabies cases Reporting format for Lab Confirmed Rabies cases Recording and reporting format for the activities of Animal Health Component- (MDV& DPM) Outbreak Investigation Form

S No.	Components of Surveillance System	Human Rabies	Domestic /Wildlife Rabies
6	Monitoring and Evaluation	The surveillance system will be monitored in terms of Timeliness, Completeness, and usefulness of the data	The surveillance system will be monitored in terms of Timeliness, Completeness, and usefulness of the data
7	Support functions	Standard Guidelines and SOPs preparation, Organization of Trainings will be done by the National Program Management Unit of NRCP of MOHFW	Standard Guidelines and SOPs preparation, Organization of Trainings will be done by designated Nodal Department or National Program Management Unit at MOFAHD
8	Data Sharing & Intersectoral coordination	Human health sector will periodically share the analyzed report time, Place & person) of animal bite incidences and Rabies deaths with respective veterinary and wildlife departments to take appropriate action	Veterinary and wildlife sector will also periodically share the mass vaccination drives and dog population managements activities undertaken in the area. The incidences of animal deaths due to Rabies will also be shared conducted with the respective Health department
		Joint Monitoring, Evaluation and Review Report for sharing with International Agencies	
9	Infrastructure and logistics	<ul style="list-style-type: none"> <li>• Web-based GIS-Enabled IT Systems, Mobile applications with appropriate infrastructure and manpower support is required for the establishment of surveillance mechanism for both human and animal health component by the respective State government targeting rabies Elimination</li> <li>• Constitution of Rapid Response Teams (RRT) in the event of Rabies deaths/ clustering of animal bites in both human and animal health sectors</li> <li>• Establishment of function Helpline Number/Toll-free numbers to assist the general public</li> </ul>	
10	Information Education and Communication	Strategic display of appropriate IEC material with the display of contact numbers forte target audience to notify any Rabies-related observed events.	

## 10.2 Surveillance of Human Health Component on NAPRE

The surveillance programme shall include Clinical/Physical, Laboratory and Serological Surveillance as per the standard guidelines by MoHFW.

Recording & reporting of every case of Animal bite victim and Rabies cases occurring in the community is an essential step for maintaining the surveillance and it will be undertaken through a dedicated portal for NAPRE which would be linked with the existing IDSP/IHIP portal. Various recording and reporting formats have been framed at each level of the health facility which would be implemented to strengthen the surveillance activities.

Recordings and reporting formats under NRCP would be available at all health facilities providing Animal Bite Management facility. (Model Anti Rabies Clinic/PHC/CHC/Sub-divisional hospital/District Hospital/Medical College and private sector health facilities). These reporting formats are available in the National Rabies control program guidelines and the website. [https://ncdc.gov.in/index1.php?lang=1 &l\\_evel=1&sublinkid=146&lid=150](https://ncdc.gov.in/index1.php?lang=1 &l_evel=1&sublinkid=146&lid=150). Reporting format for Model Anti Rabies Clinic is placed at **Annexure 10**.

## 10.3 Surveillance of Animal Health Component on NAPRE

The surveillance programme for the animals shall include and Laboratory and Serological Surveillance as per the standard guidelines by DAHD.

Recording & reporting of all events of Animal bites and animal Rabies cases occurring in the community is an essential step for maintaining the surveillance and it will be undertaken through a dedicated portal for NAPRE which would be linked with the existing National Animal Disease Reporting System (NADRS 2.0) under DAHD and National Animal Disease Referral Expert System (NADRES) of ICAR. Various recording and reporting formats would be framed for the animal health facility in the government and the private sector per the standard guidelines by DAHD which would be implemented to strengthen the surveillance activities. These formats would be available on portal for NAPRE as well as NADRS and NADRES.

Recordings and reporting formats for surveillance of Animal Rabies would also be available at all animal health facilities at Block, District and State levels.

### A. Surveillance in Wild animals

As Rabies virus is maintained in a wide range of wild animals, there may be disease transmission (Rabies) at the domestic-wild life interface in areas adjoining the forests. Therefore, a collaboration between livestock and forestry sectors (wildlife) is important for disease surveillance, sharing of disease outbreak information and prevention and control program. Activities under this will be undertaken by State Forest Department in coordination with the veterinary dept, local governing bodies and NGOs.

- **Free-ranging Wild animals-** In case any clinical signs/pathological lesions of suspected Rabies is detected in any susceptible free-ranging wild animal, the respective wildlife/forest authorities should inform the veterinary department. The samples will be referred to the Regional /State/ National Referral Laboratory by respective wildlife/forest authorities.
- **Captive wild animal** - In case any clinical signs/pathological lesions of suspected Rabies are detected in any susceptible captive wild animal, the respective zoo authorities should inform the veterinary department. The samples will be referred to regional /state/national laboratories by respective wildlife/forest authorities.

In both cases, active surveillance must be conducted to establish the following: -

- Identify whether there is a presence of any other wild animal in the area which may be having clinical signs or have pathological lesions of suspected Rabies.
- Identify whether there is any suspected Rabies case in the domestic animal in the vicinity.
- Determine whether any domestic animal have been bitten by wild animals in the vicinity.
- Determine whether there were any Suspected, Probable, or confirmed Animal Rabies case in the vicinity among free roaming dogs, pet dogs, community owned dogs in local communities in inhabiting around the perimeters of wildlife areas, forest, reserves.

In such cases, the community leader (PRM) should notify the local wildlife/forest authorities and the veterinary department.

### B. Events Based Surveillance System and Public Health action to be taken for animal health sector

#### i. Observed abnormal behavior in a stray animal (dogs running amok or causing unproved bites) Following events could be observed in the veterinary sector

##### Action to be taken

- Complete Epidemiological Investigation of the event and active case search in and around areas.
- Follow up of the animal that had bitten the livestock/pet animal – status alive or dead.
- Notify to the authorities in standard Format- Block/ District with Unique Case ID / State/ National Level.

- Conduct Risk Assessment and ensure PEP of those in contact with suspected animal.
- In case of death, send the biological sample to the lab with TPL.
- Issue advisory/ IEC about dead body disposal and use of milk or meat in case of livestock animal.

**ii. Death of a pet following animal bite / unexplained death without H/O exposure or Death of a livestock following animal bite/unexplained death without H/O exposure**

**Action to be taken**

- Complete an Epidemiological Investigation of the event and enquire about the status of vaccination.
- Follow up of the animal that had bitten the livestock/pet animal – status alive or dead).
- Send sample to the lab in the TLP (Saliva/Brain tissue if dead).
- Issue advisory/IEC about use of Dead body disposal and use of milk or meat in case of livestock animal.
- Notify to the respective authorities.
- Do Risk Assessment and ensure PEP of those in contact with the dead animals.

**iii. Unexplained Death of wild animal (captive and free-roaming both)**

The event can be observed by a common man / Forest dweller / Workers / Woodcutters / wildlife officer / forest officers / veterinary / Health care worker etc.

**Action to be taken**

Immediately inform the concerned wildlife officer/ Panchayat Raj Official (Sarpanch/ Gram Pradhan).

- Complete Epidemiological Investigation of the event through RRT.
- Send sample to the lab in the TLP (Saliva/Brain tissue if dead).
- Issue advisory/ IEC about Dead body disposal and use of Milk or meat in case of livestock animal.
- Notify to the respective authorities.
- Conduct Risk Assessment and ensure PEP of those in contact with the dead animals.

**iv. Death of any stray Animal-dogs/**

The event can be observed by a common man/ vet/ municipal workers/ Health care worker etc.

**Action to be taken**

- Immediately informed to the municipal veterinarian/ PRI and animals should be immediately removed from the community to prevent further risk of exposure. It should be confined and appropriate action to be taken as per local laws.
- The appropriate biological sample shall be taken after the death of the animal (samples from the central nervous system for laboratory diagnosis, if available).
- Active case search of cases and exposed animals in and around the area.
- Conduct Risk Assessment and ensure full Rabies PEP for those who are exposed.

**C. Events Based Surveillance System and Public Health action to be taken for Human health Sector – the event observed in the human health sector and action to be taken are as under:**

**i. Death of Human following an animal bite**

Neuro-encephalitic cases with H/O animal bite or Death of a person following animal bite reporting to a health facility (ID Hospital / Tertiary care hospital / Suspected Death in community).

**Action to be taken**

- Complete Epidemiological Investigation (search cases in and around areas, bitten by the same animal).
- Follow up of the suspected source (animal – status alive or dead).
- Collect the appropriate biological sample (Brain tissue) and transport it to the lab in the triple-layered packing.
- Notify about human death to the authorities.

- Do Risk Assessment Ensure PEP for contacts of suspected/confirmed Human Rabies Case.
- Sharing of data with Animal Husbandry/ Municipal authorities.

## ii. Cases on Animal bites in human –

### Actions to be taken

- Arrangement for timely provision of complete PEP.
- Counselling of the animal bite victim.
- Follow up for completion of PEP.
- All cases of animal bites to be analyzed on weekly basis in terms of time place and person to identify clustering and in terms of the Quality parameter as defined above.
- Periodic data sharing with respective Animal Husbandry/ Veterinary Depart and Local Government (Municipalities/ PRIs).

## 10.4 Standard Case Definition to be used for Surveillance System:

### A. Standard case definitions for Human Rabies:

Rabies surveillance under National Rabies Control Program and the Integrated Disease Surveillance Programme (IDSP) is of three types. Suspect Case has to be reported by a health care worker in S Form, Probable Case has to be reported by medical officer in P form and Lab confirmed case has to be reported by all Laboratories having confirmatory test facilities for Rabies in L form. The definitions are as under: -

**Table 5 Standard Case Definition for Human Rabies**

Case	Definition
Suspect Case	Death of a human with a history of dog bite a few weeks/months preceding death. Wherever available, the details of such cases should be shared in a line list– Name, Age, Gender, Address
Probable Case	A suspected human case plus history of exposure <sup>#</sup> to a (suspect <sup>¥</sup> / probable <sup>€</sup> ) rabid animal <sup>#</sup> Exposure is usually defined as a bite or scratch from a Rabies-susceptible animal (usually dogs). It could also be lick exposure to open wounds, abrasion, mucous membranes of the patient. <sup>¥</sup> A suspect rabid animal is a Rabies-susceptible animal (usually dogs) which presents with any of the following signs at the time of exposure or within 10 days following exposure: unprovoked aggression (biting people or animals or inanimate objects), hypersalivation, paralysis, lethargy, abnormal vocalization, or diurnal activity of nocturnal species. Whenever the history of mentioned signs cannot be elicited, the history of exposure to a Rabies-susceptible animal would be considered adequate. <sup>€</sup> A probable rabid animal is a suspect rabid animal (as defined above) with additional history of a bite by another suspect / probable rabid animal and/or is a suspect rabid animal that is killed, died or disappeared within 4-5 days of observing illness signs.
Laboratory Confirmed Case	A suspect or a probable human case that is laboratory-confirmed by one or more of the following tests: Detection of Rabies viral antigens by direct fluorescent antibody test (FAT) OR by ELISA in clinical specimens, preferably brain tissue (collected postmortem). OR Detection by FAT on skin biopsy (ante mortem) OR FAT positive after inoculation of brain tissue, saliva or CSF in cell culture, or after intracerebral inoculation in mice or in suckling mice OR The detectable Rabies-neutralizing antibody titer in the serum or the CSF of an unvaccinated person OR Detection of viral nucleic acids by PCR on tissue collected postmortem or intra vitam in a clinical specimen (brain tissue or skin, cornea, urine or saliva).



## B. Standard case definitions for Animal Rabies

As per the WHO guidelines<sup>5</sup> proposed case definitions and surveillance activities to be undertaken by the veterinary officer in case of Suspected, Probable and lab Confirmed animal Rabies are mentioned in table below<sup>6</sup>:

**Table 6 Standard Case Definition for Animal Rabies**

Case	Definition
Suspected Animal Rabies	A case that is compatible with a clinical case definition of animal Rabies An animal that presents with any of the following signs- 'hyper salivation, paralysis, lethargy, unprovoked abnormal aggression (biting two or more people or animals and/or inanimate objects), abnormal vocalization and diurnal activity of nocturnal species' <b>Or</b> any animal showing the signs of dumb form of Rabies
Probable animal Rabies	A suspected case + reliable history of contact with a suspected, probable or confirmed rabid animal <b>and/or</b> An animal with suspected Rabies that is killed, died <b>or</b> disappears within 4–5 days of observation of illness
Confirmed animal Rabies	A suspected or probable animal case confirmed in a laboratory
Not a case	A suspected or probable case that is ruled out by laboratory tests or epidemiological investigation (i.e., appropriate quarantine period in eligible animals).

## C. Laboratory surveillance

Lab-based surveillance would be done when the suspected/confirmed animal is dead and post mortem is done and laboratory confirmation is needed to confirm whether the cases was Rabies. This is especially important when the dog is known to cause dog bites in an area.

- **Virological Surveillance-** The brain tissue samples from carcasses (especially dogs and cats) shall be collected and subjected to a rapid antigen detection test and FAT to find a Rabies case. Samples tested positive to FAT could be archived for molecular analysis and research purpose to identify the circulating virus in the region.

*Surveillance to map the genome of RABV and Lyssa viruses circulating in the country among animals and seroconversion studies in animals that have been treated with anti-Rabies vaccination following rabid dog bites could be undertaken by Research Laboratories, Research Institutes and Veterinary Education Institutes.*

# 11

## Laboratory Diagnosis of Rabies

Diagnosis of human and animal Rabies is a challenge due to the lethality of the Rabies virus and difficulties encountered to obtain the samples for undertaking laboratory diagnosis. However, strengthening Rabies diagnostics at various level is essential for the country while envisaging a plan to eliminate Rabies. A definitive, reliable diagnosis of Rabies in humans and animals requires appropriate laboratory structure with adequate biosafety measures. The importance of various laboratory methods in humans and animals and their importance is as under:

### 11.1 Importance of diagnosis of Rabies in humans

Although the diagnosis of Classical Rabies can be made easily based on history and the typical clinical signs and symptoms but the paralytic form of Rabies often is difficult to diagnose. Apart from this, the laboratory support for Rabies is important for the following: -

- Confirmation of clinical diagnosis-especially in paralytic/atypical cases.
- Prophylactic vaccination to relatives, clinical & nursing staff.
- Characterization of causative agent/molecular epidemiology.
- National Rabies Control Programme/NAPRE: Surveillance and estimation of disease burden.
- Confirmation/Monitoring of disease-free status (e.g., Andaman/ Nicobar & Lakshadweep Islands, Nilgiris, Goa, Sikkim etc).

The confirmation of the diagnosis of rabies in animals is required for appropriate public health response and intersectoral coordination

### 11.2 Testing conventional test available for diagnosis of Rabies

#### Conventional tests available for Diagnosis:

- a. Detection of Antigens: Fluorescent Antibody test (FAT), Direct Immunohistochemistry test (dRIT), virus isolation, (Rapid Tissue Culture Infection test- RTCIT), Mouse Inoculation Test (MI), Rapid Immunochromatography test/ Lateral Flow Assay (LFA) , Reverse transcription polymerase chain reaction (RTPCR).
- b. Detection of Antibody: Enzyme-linked immunosorbent assay (ELISA), Rapid Fluorescent Foci Inhibition Test (RFFIT), Fluorescent Antibody Virus Neutralization (FAVN) test.

### 11.3 Sampling

Sampling and various laboratory tests are available for diagnosis of humans Rabies (Ante-Mortem & Post-Mortem) and animals (post-mortem) are as under: -

- **Sampling for post-mortem diagnosis in humans and animals:** Brain tissue is the preferred specimen for post-mortem diagnosis in both humans and other animals. In many situations, it may not be possible to remove the brain for post-mortem sampling because of factors such as family consent or practical and biosafety issues related to the removal of animal brains in the field. Some of these challenges can be overcome by collecting samples with effective, well-established techniques that require less

invasive post-mortem routes, such as through the orbit or foramen magnum. A diagnostic sample can be collected without opening the skull, for example by introducing a 5-mm drinking-straw or a 2-mL disposable plastic pipette into the occipital foramen in the direction of an eye or using a trocar to make a hole in the posterior wall of the eye socket and introducing a plastic pipette or straw. Samples can be collected from the rachidian bulb, the base of the cerebellum, the hippocampus, the cortex and the medulla oblongata. When a straw is used, it should be pinched between the fingers to prevent material from escaping on withdrawal.

- **Sampling for intra-vitam diagnosis in humans Secretions**, biological fluids (such as saliva, CSF, tears, serum), and some tissues (such as skin biopsy samples, including hair follicles at the nape of the neck) can be used to diagnose rabies during life (1, 2). Although serum and CSF may not be very sensitive specimens for ante-mortem diagnosis, particularly in the early course of illness, a positive result provides valuable diagnostic information. The samples that afford the highest diagnostic sensitivity are at least three saliva samples, taken at intervals of 3–6 h, and skin biopsies (including hair follicles). Ideally, samples should be stored at –20 °C or less.
- Ideally, brain tissue should be kept refrigerated or frozen until testing. If this is not possible, samples can be preserved at ambient temperature in a 50% glycerine–saline solution. Freezing of samples in glycerine is not recommended. The glycerine must be removed by washing prior to testing, and acetone fixation is not recommended before the direct fluorescent antibody test.

Examination of chemically fixed specimens for viral antigens can be both sensitive and specific if appropriate tissues and tests are used but is not recommended for routine diagnosis. If specimens are received in formalin, the duration of brain fixation should be approximately 7–14 days before embedding in paraffin. Wet tissue specimens should be transferred from formalin to absolute ethanol for subsequent molecular diagnosis and antigen detection.

For molecular studies and genetic characterization of viral strains, the impregnation of brain tissue or body fluid suspected of infection with RABV on filter paper containing proper inactivating chemicals allows safe, stable, cost-effective shipment of samples at ambient temperature. Effective viral inactivation should nevertheless be ensured before shipment.

**Table 7 Standard diagnostic tests for Rabies**

Species (time of test)	Antigen detection		RNA detection		Virus isolation		Antibody detection	
	Sample <sup>a</sup>	Test <sup>b</sup>	Sample	Test	Sample	Test	Sample	Test
<b>Human (ante-mortem<sup>c</sup>)</b>	Skin/ hair follicles	FAT	<b>Skin/ hair follicles</b> <b>Saliva</b> Tears CSF	RT- PCR <sup>d</sup>	Saliva Tears CSF	<b>RTCIT</b>	Serum CSF	<b>RFFIT</b> <b>FAVN-test</b> IFA ELISA
<b>Human (post-mortem)</b>	<b>Brain</b> Skin/ hair follicles	FAT DRIT IHC	<b>Brain</b> Skin/ hair follicles	RT-PCR	Brain	<b>RTCIT</b> MI	NA	NA
<b>Animal (post-mortem)</b>	Brain	<b>FAT DRIT</b> IHC LFA	Brain	RT-PCR	Brain	<b>RTCIT</b> MI	NA	NA

Source: WHO TRS 2012

<sup>a</sup> If more than one sample type is listed, the one(s) shown in bold have highest diagnostic sensitivity.

<sup>b</sup> If more than one test is listed, the one(s) in bold are preferred.

<sup>c</sup> Positive results in ante-mortem samples are diagnostic, but negative results do not rule out rabies.

<sup>d</sup> Molecular diagnosis can be performed RT-PCR by conventional or real-time format.

## 11.4 Organization of Laboratory network for Rabies diagnosis in NAPRE

Under the NAPRE, it is envisaged that a tiered structure of the laboratory facilities for Rabies diagnosis needs to be established at various levels in a phased manner. The laboratory facilities at various levels will be entrusted to provide diagnosis, surveillance, training, and quality monitoring of the activities undertaken for both human health and animal health component. List of existing Laboratories at each level for humans (**Annexure 11**) and animal health is at **Annexure 12**.

### A. National Referral Laboratories

National Laboratories will be identified which will serve as a National Referral Lab (NRL) for both human and animal samples. The capacities of these NRL will be strengthened in a phased manner. The manpower will be trained on various epidemiological microbiological and biotechnological aspects of Rabies.

#### Activities envisaged at NRLs are as under: -

1. NRL will play a key role in Technical support, capacity building and supervision of all the sub-national laboratory activities. The NRL will facilitate capacity building of the states on following technical aspects:
  - Surveillance for RABV virus.
  - Sero-monitoring for vaccine efficacy.
  - Standard Laboratory diagnostics and protocols.
  - Quality assurance systems.
  - Biosafety and Biosecurity awareness and practice.
2. A subset of samples will be sequenced to determine the genotype and maintain a national database on the virus genotypes circulating in the population.
3. NRL will frame Standard guidelines and technical documents on lab aspects for Rabies.
4. Participation in WHO/OIE proficiency testing and overall quality control.
5. Participate in Research and survey activity.
6. Certification for international transportation of pet animals such as dogs and cats.
7. NRL will facilitate and coordinate sharing of data and line list of Rabies cases to all the stakeholders and subnational labs.

### B. Regional Referral Laboratories

Regional Laboratories will be identified which will serve as a Regional Referral Lab (RRL) for 5 to 6 states in its jurisdiction to support the Rabies diagnostics in human as well as animal samples. The RRLs may be established at the identified medical and/or veterinary institute. The services provided by RRLs will be the same as the NRLs except for the quantum of the services.

### C. State level Laboratories

At least 2 to 3 State Referral Laboratories (SRL) will be identified for Rabies diagnosis in selected medical colleges laboratory/ veterinary institutes/colleges, infectious disease hospitals and tertiary care institutes in each state. The SRL will undertake capacity building on various epidemiological and microbiological aspects of Rabies.

#### Role of State Level Laboratories:

1. **Animal Diagnostic Labs** –Provide training on brain sample collection, packing, transportation, processing of samples by LFA to District level laboratories (at least 2 /District).
  - Test the samples by employing Direct Fluorescent antibody Assay (DFA) / Direct Rapid Immunohistochemistry Test (dRIT).
  - Transport of samples (brain/serum) in the cold chain to the Regional Laboratory along with the details.
2. **Human Diagnostic Labs**- Undertake capacity building on the epidemiological and microbiological aspects of Rabies Diagnosis by using qualified ELISA, PCR, and FAT etc.
  - Share the reports of testing with the district labs.
  - Upload the outcome of testing in the National portal.

## D. District Level Laboratory

The capacities of district labs will be strengthened in a phased manner. These laboratories will perform the testing and would also be linked to SRLs, RRLs and NRLs and other ARCs in the district, sub-district levels in the region. The manpower will be trained on using LFA, Anti-Rabies titre estimation by ELISA and PCR. Below the district i.e., at the block level, no standalone Rabies diagnostic facilities are envisaged, however, the Rapid Diagnostic Tests (RDTs) like LFA by the Block level veterinary department will be prompted for confirmation of a clinical diagnosis of the animal.

### Role of District Level Laboratories

1. Provide training on Collection of samples, packing, transportation to Block / Taluk level /Wildlife veterinarians and medical officers and staff.
2. Submit postmortem animal samples (brain/serum) to the State Level laboratories for DFA/dRIT along with the result of LFA.
3. Conduct Lateral Flow Assay (LFA).
4. In case the of humans ante mortem and postmortem diagnosis, the samples will be referred to the higher level as per the standard guidelines.

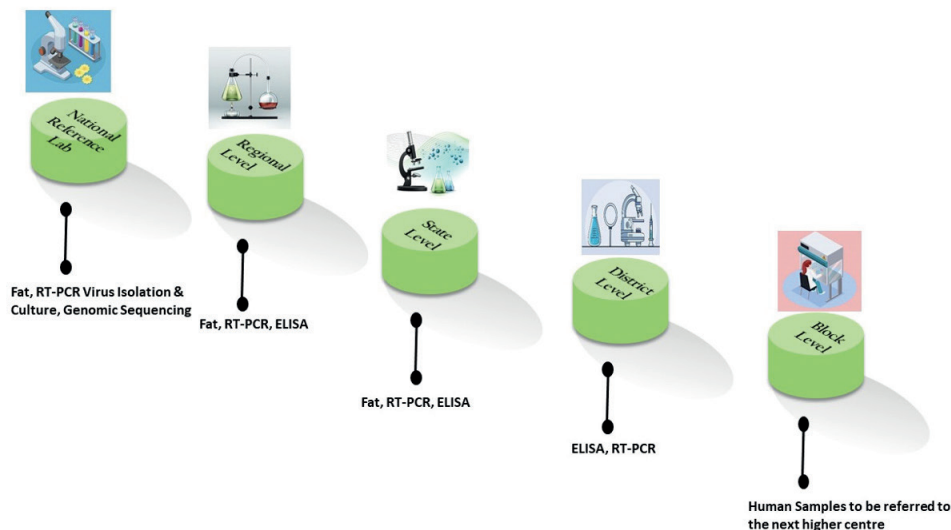


Figure 14 Network of Laboratories and test to be available for Public Health Sector Laboratories

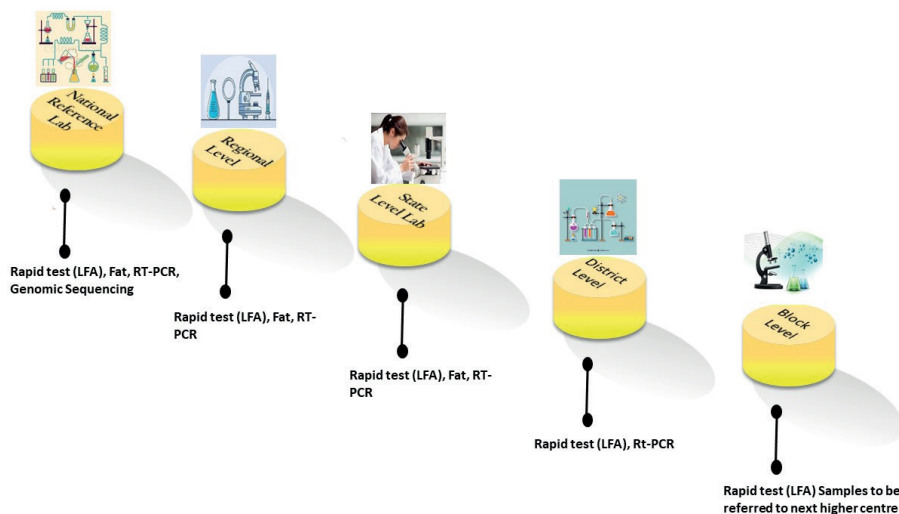


Figure 15 Network of Laboratories and tests to be available at various levels for Animal Health Laboratories

## 12

# Guidance for Development of State Action Plan for Dog Mediated Rabies Elimination from India (SAPRE)

State nodal officers of the health department and veterinary department will prepare a joint state action plan for Rabies elimination as per the needs of the state. The steps in the development of state action plan are as follows: -

1. **Joint Gap analysis (to be done by each stakeholder)** - As each state has a different burden of Animal Bites & Rabies, resources in the health & veterinary sector hence each state needs to develop the state action plan based on the needs for the respective state as under. The Joint Steering Committee at State Level needs to prepare the action plan through Nodal officers of health and veterinary sectors. Following are basic domains in which gap analysis of each state is to be undertaken:
  - a. Estimate the Burden of Rabies in the state and identify the population at risk /vulnerable population.
  - b. To identify the high-risk areas at the districts and block level.
  - c. Identification and mapping of health facilities in the areas wherein animal bite management and management of Rabies in patients are to be done.
  - d. Identification of veterinary infrastructure, veterinary clinics, local NGOs, and municipal/civic bodies' active in the areas.
  - e. Identification of laboratory facilities in the state in both sectors.
2. **Identification of earmarked funds-** Health and veterinary sectors need to identify the funds that could be made available for the activities to be undertaken for Rabies control. For the human health component, funds are to be explored under NRCP in NHM PIP for each year. Source of funds identified under NAPRE to operationalize both human and animal components are described in **Annexure 4**. The state may also allocate additional funds from the state budget based on the requirements. NAPRE focuses on the development of herd immunity in the dog population through ARV of at least 70% of dogs and along with strategic DPM, case investigation, disease diagnostics, etc. The Veterinary sector needs to explore the availability of funds under ASCAD, RKVY scheme, under the State Animal Husbandry and State Agriculture Department need to be explored. Similarly, in the case of DPM, the ABC scheme of AWBI, under individual municipalities, urban local bodies, and the Urban Development Department could be explored. Efforts have to be made for uninterrupted funding for MDV which would be regular & continuous activity so that 70% of dogs are vaccinated against Rabies.
3. **Identify the stakeholders involved, and define roles and responsibilities-** Each state has to identify the stakeholders from the Medical, veterinary, and Wildlife sector, education dept, science, and biotechnology dept, NGOs and voluntary organization, representative of Resident welfare associations, etc. Thereafter roles and responsibilities for each stakeholder to be demarcated after consultation with each stakeholder.
4. **Identify laboratory networks in the State** - Different states have different surveillance needs and surveillance capabilities. Initially, the designated laboratory shall be identified by the concerned states from existing State Disease Investigation Laboratories, and or Regional Coordinators. Subsequently, RRL and SRL will be connected for each District.
5. **Preparation of action plan with activities to be undertaken at each level for the next 10 years.-** Based on the mapping of stakeholders and resources available for the state, each state will prepare the action plan for the next 10 years to achieve elimination of Rabies from the state based on the guiding principles outlined in the NAPRE.

6. **Submission of the action plan by January 2022** – Each state is expected to prepare the action pal by January 2022. State-level meeting of the state zoonosis committee may be undertaken to review the action plan at the state level.
7. **Joint review of the action plan submitted by the state by NCDC and DAHD**- Action plan thus submitted will be reviewed by respective sectors at National level and feedback will be provided to the individual state for any suggestion.
8. Implementation of the program by the state from the next financial year.

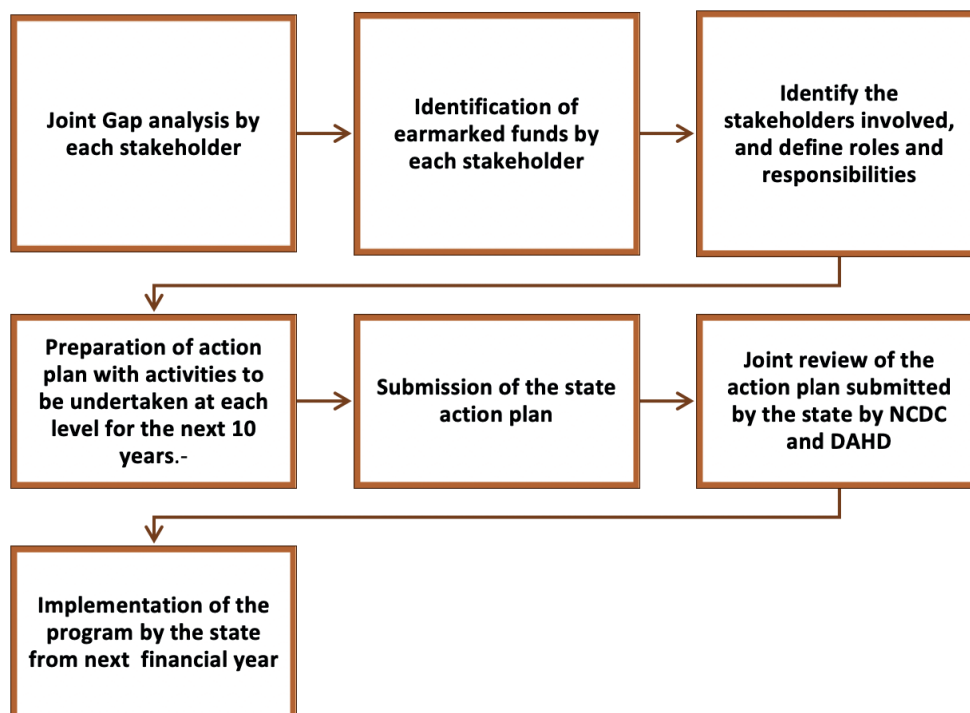


Figure 16 Steps for development of State Action Plan for Rabies Elimination

## 12.1 Plan of Implementation for NAPRE at the State Level

### A. Short term plan- (Year 2023, 2024, 2025)

#### i. Preparatory phase:

- Advocacy for prioritizing Rabies in the State.
- Estimate burden of human and animal Rabies in the State.
- Identify or establish funding (e.g. schemes, program), components underfunding (such as vaccines, training, IEC etc.).
- Establish technical guidelines on the canine Rabies control programme.
- Develop training modules for medical officers, veterinarians, and support staff
- Develop a short terms-plan, medium term and long-term plans.
- Development of SOP for animal bite management, dog enumeration plan, MDV, DPM as per the national guidelines and the ABC act.
- Identify villages/talukas/districts/ based on animal bite cases and evidence as high-risk areas, medium-risk area, and low-risk areas.
- Achieve Intersectoral collaboration by sharing information among stakeholders.
- Initiate inter-departmental collaboration (DAHD, Local self-governing bodies, NGOs) through MoU.
- Form a joint steering committee at each level.
- Identify the Regional, District Laboratories, State Reference Laboratories and National Referral Laboratories.



- Strengthen these laboratories for Rabies diagnostics.
- Initiate capacity building, Professional education and training of staff needed for activities planned.
- Develop a joint State Specific Action Plan for Rabies elimination with the micro plan for districts as per the risk areas or start a pilot project in the selected city, district or block for implementation of the program.
- Estimate Dog population in the selected areas.
- Estimate requirement of Human and animal ARV and ARS.
- Start aggressive campaigns for vaccination of dogs and responsible dog ownership campaign.
- Initiate Strategic MDV in selected areas.
- Evaluate vaccination coverage in canines with an aim to vaccinate a minimum of 70% population.
- Develop joint Outbreak response teams.

## **B. Medium-term plans- Phase 2 Activities (Year 2025, 2026, 2027)**

### **ii. Scale-up dog vaccination:**

- Continue the advocacy and creating awareness on Animal and human Rabies.
- Scale-up implementation of the programme throughout the country. The results of the pilot project in a selected city /block/district with improvements should now be implemented in another area.
- Strengthening the Laboratory capacity and testing at each level as per the needs of the state.
- Establish surveillance systems, including feedback mechanisms, and coordination between administrative levels (national, state, district, municipal, etc.).
- Evaluate vaccination coverage in canines.
- Registration of pet and community-owned dogs.
- Continue mass Vaccination of dogs.
- Continue Surveillance activity for human and dog Rabies, and the number of animal bite cases.
- Continue canine population count.
- Early reporting of dog bite and complete PEP (by ID methods) and Immunoglobulin.
- Strengthening Laboratory capacity and testing.
- Declare dog-mediated Rabies free zones (villages/blocks/districts) and state.

## **C. Long term plans- Phase 3 and Phase 4 activities (2028, 2029, 2030)**

### **iii. Maintain dog vaccination status and Intensified Rabies Surveillance**

The vaccination of dogs and DPM would be continued activity. Areas /affected districts where elimination targets have not been yet achieved would require the adoption of corrective measures. The long phase will be followed by the certification of elimination status by the competent authority. A national review commission will certify elimination status and will review the progress.

- Continue the advocacy and creating awareness on Animal and human Rabies.
- All States implementing ID Route for Rabies PEP in major health facilities.
- Declare dog-mediated Rabies free zones (villages/blocks/districts) and states and Regions.
- Continue Surveillance activity for human and dog Rabies.
- Upgrade surveillance of Rabies from canine to other animals.
- Continue implementation of dog population management.
- Conduct joint field investigations in case of Human Rabies cases.
- Characterization and analysis of circulating Rabies virus variants by a national or international laboratory.
- Get declaration of Animal Rabies free country by OIC.
- Get declaration of Animal Rabies free country by WHO.
- Verify freedom from Rabies every year 2030 onwards.

# 13

## Plan of Implementation of the National Action Plan for Rabies Elimination

Based on the strategic components, it is envisaged that States will prepare a comprehensive action plan for both human and animal health components. Whereas the funds for Human health components will continued to be source from NHM, the funding for the animal health components will be explored through existing ASCAD Schemes or revenue available with Municipal corporations or State Vet Departments. The delivery of services for the animal health shall be done through the already existing veterinary infrastructures and established channels like Animal Husbandry Department, Urban/Rural Governing Bodies, NGOs and Municipal cooperation.

As the human health component under the National Rabies Control Program is already being implemented in the country, the identified States Nodal Officers and District Nodal Officers will continue implementing the activities of the human health component.

For Animal Health Components the respective States will identify and nominate State and District Nodal Officers selected and will coordinate with identified States Nodal Officers and District Nodal Officers of Human Health Component for implementing the activities.

A brief about the plan of implementation for both the components are as under:

**Table 8 Component for implementing the activities of animal health**

	Human Health Component	Animal Health Component
Nodal agency for planning and execution at the centre	NCDC, MOHFW Division of Zoonotic Diseases Program	DAHD, MOFAHD Division of Livestock Health/ National Live Stock Mission (Animal Welfare)
	<ul style="list-style-type: none"> <li>• Combined Action by both departments for mapping and actions for prevention and control measures accordingly.</li> <li>• To provide integrated training of both health and Veterinary Professional, Paravets and other allied personnel on program management and implementation.</li> <li>• Liaise with different stakeholders/agencies/international organizations (e.g. FAO, OIE, WHO, SAARC) for technical support.</li> <li>• Explore the possibility of projects/donor agencies for the skill development of manpower and undertaking disease prevention and control activities in the country.</li> <li>• The possibility of linking the NADRS, NADRES to IHIP portal for selected parameters to be explored Public Private Partnership through Involvement of NGO and civil societies/community.</li> <li>• Monitor and evaluate the Rabies control programs implemented by the field units.</li> </ul>	

	Human Health Component	Animal Health Component
Nodal agency for planning and execution at State level	<b>State Health Department, State NHM</b> <ul style="list-style-type: none"> <li>Identified State Nodal Officer (SNO) for NRCP will coordinate the activities.</li> </ul>	<b>State Animal Husbandry Departments,</b> Director State AH dept nominate a State Nodal Officer for Animal Health Component <ul style="list-style-type: none"> <li>The State Veterinary department will implement the activities of animal health component in cooperation with municipal bodies in urban areas and Panchayati Raj systems in rural areas.</li> <li>It is the responsibility of State Animal Husbandry Department to devise methodology and assign duties to participating officer for monitoring surveillance activities.</li> </ul>
	Develop State action plan as per activities envisaged under National action plan	
District Level	<b>District Health Officer</b> <ul style="list-style-type: none"> <li>Identified District Nodal Officer (DNO) for NRCP will coordinate the activities.</li> </ul>	<b>Identify District Nodal Officers</b> (Dist. Vet Officer) <ul style="list-style-type: none"> <li>Coordinate with local governing bodies, local authorities, and NGOs.</li> </ul>
	Develop micro plan /district/block action plan as per activities envisaged under the state action plan	
Block Level	<b>Block Medical Officers</b> <ul style="list-style-type: none"> <li>Implementation of the program at ground level.</li> <li>Coordination with block veterinary officer.</li> <li>Reporting to District Nodal Officer (DNO).</li> <li>Feedback to DNO for refinement/ betterment of the program as per field scenario.</li> </ul>	<b>Block Veterinary Officer or equivalent</b> <ul style="list-style-type: none"> <li>Implementation of the program at ground level.</li> <li>Coordination with block medical officer.</li> <li>Reporting to district nodal officer, Animal Husbandry.</li> <li>Feedback to district nodal officer, AH for refinement/ betterment of the program as per field scenario.</li> </ul>

# 14

## Monitoring & Evaluation

The NAPRE envisages that joint monitoring mechanisms for both human and animal health components at all levels as well as an independent component-wise monitoring by the concerned stakeholder as per their respective guidelines. The independent external evaluation of the state action plan will also be undertaken periodically. The key objective of monitoring and evaluation will be to assess the progress made at each level to achieve the target of rabies elimination, to identify challenges and to provide the solutions to the extent possible by advocacy and facilitation.

### 14.1 Institutional mechanism for monitoring and evaluation

The institutional mechanism for monitoring and evaluation at the National, regional, state and district level will be as under:

**Table 9 Institutional Mechanism for Monitoring Evaluation**

At National level		
Joint Monitoring	Joint Steering Committee at Central Level (Proposed) –Annexure 1 National Technical Advisory Committee –Rabies (Exists) Standing Committee on Zoonoses under DGHS (Exists)	
Component wise	The human health component would be monitored through existing NHM monitoring mechanisms (Common review missions and Joint review missions) and as per the guidelines and NCDC. Monitoring will be done as per the indicators.	DAHD (Animal Health Component) The animal health component would be monitored as per the guidelines.
At Regional level		
Joint Monitoring	Regional Coordinators under the National One Health Programme for Prevention and Control of Zoonoses	
Component - wise	Regional Directors of Health Sector	Regional Director of the veterinary sector and Wild life sector/Disease Diagnostic Lab.
At State level		
Joint Monitoring	A joint monitoring committee is proposed to monitor the State action plan for Rabies elimination (SAPRE) - <b>Annexure 2</b>	
Component-wise	As per the operational guidelines of NRCP	As per the operational guidelines of the State Animal Husbandry Department
At District and below the district level		
Joint Monitoring	As per the operational guidelines of the state animal husbandry department	
Component-wise	As per the operational guidelines of NRCP	As per the operational guidelines of the state animal husbandry department

## 14.2 Monitoring Indicators to assess the progress at State level:

The State progress will be jointly monitored by national nodal agencies in health and veterinary sectors. A set of input and process indicators are identified to measure the outcome and achievement of goal of Rabies Elimination.

### A. Input Indicators:

The input indicators are those indicators who will assess the progress of the states with respect to their preparedness for formulation and operationalization of State action plans. These input indicators are also a measure of successful implementation of National Action Plan for Rabies elimination through continues advocacy among stakeholders at national and state level.

The input indicator for monitoring and responsible stakeholders will be as under

**Table 10 Monitoring Indicators to assess at State-Level**

S No	Indicators	Responsible stakeholders
1	Number of States where advocacy for Rabies control program has been done at all levels	State Animal Husbandry Department, and State Health Department
2	Number of States who have formulated SAPRE and submitted it to national nodal agencies in the human and veterinary sector	Animal Husbandry Department, Health Department,
3	Number of States who have structured mechanism for Rabies notification both in the human and veterinary sector	State Animal Husbandry Department, and State Health Department
4	Number of states who have developed and relevant Technical Guidelines; Standard Operating Procedure for human and animal health components of SAPRE	State Animal Husbandry Department, and State Health Department and wild life sector
5	Number of States which have designated State Program Management Unit for operationalization of SAPRE for both human and animal health component	State Animal Husbandry Department, and State Health Department, wild life sector
6	Number of states who have earmarked funding for animal and human components	State Animal Husbandry Department, and State Health Department
7	Number of states who has organized training programs for Medical, Veterinary and allied manpower for different components of SAPRE	State Animal Husbandry Department, and State Health Department
8	Number of states-initiated School Health awareness Programme for Rabies prevention	Department of Human Resources
9	Number of States who have planned and executed and completed Dog Enumeration exercises or mapping of risk zones for undertaking animal health component activities	State Animal Husbandry Department, and State Health Department, wild life sector and State task force identified by state govt for SAPRE
10	Number of States who have planned and executed and completed mass dog Vaccination	State Animal Husbandry Department, State Animal Welfare Board
11	Number of States who have planned executed and completed Strategic DPM / ABC activities	State Animal Husbandry Department, State Animal Welfare Board
12	Number of Sate labs strengthened to carry out lab diagnosis for rabies as envisaged under NAPRE both in the health and veterinary sector	State Animal Husbandry Department, and State Health Department

## B. Process Indicators

The process indicators are those indicators that are defined to measure the progress of the Core component of NAPRE i.e. Human health and animal health component. The process indicators to assess the progress of target achievements and their means of verification is described as under.

**Table 11 Process Indicators for Human Health Component**

Activities	Technical Indicator	Objectively Verifiable Indicator(s)	Means of Verification	Source of Information
1. Timely competition of PEP for animal bite victims.	Number of States who have adequate supply ARV and ARS at animal bite management facilities.	ARV/ARS procurements and Utilization % of facilities with no Rabies vaccines and serum stock out	Stock register, Records and reports available at Animal Bite Management facilities / Hospital records/ Media reports about shortage/ Public Grievances	State Health Departments and State Nodal Officers of NRCP DVDAMS portal/ Media Supervision reports
	Number of States who have implemented ID Route in major facilities	% of facilities implementing ID route of ARV	NRCP format	State health Department SNO NRCP.
	To assess the RIG utilization and coverage	% of designated health facilities with no RIG stock-outs % of Category 3 bites received RIG	Review of annual report on RIG use NRCP Monthly format	
	PEP completion rate among eligible Rabies exposed cases	% of eligible cases with PEP completed	NRCP reports	NRCP reports Operational research
	Pre-exposure Prophylaxis among high risk categories and children	% of at-risk groups that receive complete dose of Pre-exposure prophylaxis as per guidelines	NRCP reports	NRCP reports, Immunization reports
2. Capacity building -	Trained staff of animal bite management	Number of staffs trained in facilities on appropriate animal bite management and Rabies PEP	Number of training certificates issued  Trained Participants List	NRCP Training Reports
		% of facilities with trained staff with the bite wound management guidelines	Regular supervision reports	
3. Diagnostic Support	Strengthening laboratory diagnostic capacity for Human Rabies Diagnosis	% of laboratories equipped with diagnostic facilities Number of samples for Rabies submitted and tested	Laboratory assessment reports	NRCP reports SRL & RRL reports Report of Disease Surveillance unit
4. Surveillance	Strengthening surveillance of Rabies cases and animal bites	% facilities reporting Rabies cases and animal/dog bites	NRCP Reports and IDSP/ IHIP Reports	NRCP IDSP Disease Alert Report Surveillance unit (web portal)

**Table 12 Process indicators for Animal Health Component**

Activities	Technical Indicator	Objectively Verifiable Indicator(s)	Means of Verification	Source of Information
5. Dog enumeration of Vaccination	Enumeration exercise/ Risk zone mapping	% of Blocks/ Districts completed enumeration of dogs % of mapped high-risk areas in District	State Animal department Format	State Animal Husbandry Department
	Mass Dog Vaccination with a target to vaccinate more than 70% of dog population Annually	Proportion of dogs vaccinated for Rabies	Post vaccination surveys in each of the States	State Animal Husbandry Department annual vaccination reports
		% of States with 70% vaccination coverage	Number of doses of Rabies vaccine administered	State Animal Husbandry Department annual vaccination reports
	Dog Population management	% Change in Dog population in respective areas	Change in the number of FRD, Pet and community owned dogs	Survey reports of State Animal Husbandry Department
6. Diagnostic support for animal rabies diagnosis	Strengthening Lab capacity	Number of labs strengthen in veterinary sector for Rabies diagnosis	Reports	Reports
7. Containment	Containment of Rabies cases in Identified areas	Proportion of animal Rabies cases confined and number of containment zones declared	Number of Rabies cases confined and containment zones established	State Animal Husbandry Department outbreak reports
8. IEC	Raise awareness on responsible dog ownership among citizens	% population / household aware of responsible dog Ownership	KAP survey	Survey report
9. Surveillance	Strengthening surveillance of Animal Rabies	% of Animal Rabies cases captured by surveillance system Proportion of the outbreaks responded to in time	Surveillance system evaluation report / Records review	State Animal Husbandry Department reports (web portal)

**Table 13 Other Process Indicators**

Activities	Technical Indicator	Objectively Verifiable Indicator(s)	Means of Verification	Source of Information
10. Advocacy, Communication and Social Mobilization	Measuring public awareness about the risk of Rabies and prevention of dog-bite	% of population aware of Rabies, prevention and control	KAP survey	KAP survey results



11. Inter-Sectoral Coordination	Assess level of partnerships and multi-sectoral collaboration among ministries, other government agencies, NGOs and private sectors for implementation of the NAPRE	Proportion of identified stakeholders onboard in Joint Monitoring committees and joint taskforces constituted by States	Number of stakeholders attending periodic review meetings	Monitoring Reports
12. Resource Mobilization	Assessment of Resources to support the Rabies elimination activities	Budget for Rabies prevention and control provided in human component	Approved budget and record of budget allocation	State Health Department Financial Report
	Assessment of Resources to support the Rabies elimination activities	Budget for Animal ARV, Trainings, IECs provided in Animal Component	Approved budget and record of budget allocation	State & National Animal Husbandry Dept reports / SAPRE operational plan document
		Numbers of partners involved in the project	Budget report	NRCP Annual report
13. Operational Research	To invite development partners/agencies to participate and manage aspects of the project	% of applicable studies done	Study reports	Dissemination of results Manuscript
	Conduct studies to examine operational feasibility and effectiveness for modified regimen for Rabies post exposure prophylaxis	Number of studies done	Study reports	Dissemination of results Manuscript
	Conduct studies for estimating the coverage of ARV and ARS and compliance of the vaccination	Number of studies done	Study reports	Dissemination of results Manuscript
	Conduct molecular epidemiological studies of Lyssa viruses circulating in animals in India	Number of studies done	Study reports	Dissemination of results Manuscript

### C. Output/Outcome indicators:

These indicators are to assess the overall impact of the activities undertaken under NAPRE and to see the progress towards the ultimate goal of achieving zero human deaths due to dog-mediated Rabies by 2030 (Reduction to below 1% of the incidence of Rabies in humans as well as in animals). The outcome target and indicators thereof are described as under-

**Table 14 Outcome Target Indicators**

Technical Indicator	Objectively Verifiable Indicator(s)	Means of Verification	Source of Information
To progressively reduce and ultimately eliminate human Rabies in India through sustained, mass dog vaccination and appropriate post-exposure treatment	No of states who has Rabies as notifiable diseases in Human & Animal	Publication / Amendment through the State Public Health / State Disaster act/ Epidemic Act Gazette	State Gazette
	% Decrease in Rabies in Humans	Monthly /quarterly/ Yearly Surveillance records	Annual Reports, Surveillance Reports
	% Decrease in Rabies in Animals	Surveillance records	Annual reports, Surveillance Reports

# ANNEXURE



## Annexure 1. Constitution of Joint Steering Committee at National level

The Joint Steering Committee at the National level will be the highest administrative body to advise on all matters related to the National Action for Rabies Elimination in India and the region.

### Term of reference:

The committee will be responsible for determining policy, implementation of the policy, and monitoring the collaborative activities planned for the programme. The National Joint Steering Committee shall monitor & provide guidance for implementation of the Rabies Elimination Plan and shall meet as often as necessary, but at least once in a year. All the matters related to Rabies elimination activities including the international level will also be dealt with this committee. The proposed constitution of the Joint Steering Committee at the National level is as under-

National Joint Steering Committee	
Secretary, MoH&FW, Govt. of India	Chair
Secretary, Ministry of Fisheries, Animal Husbandry & Dairying, Govt of India	Co-chair
Special Secretary (Health), MoH&FW, Govt. of India	Member
Additional Secretary and Mission director, National Health mission MoH&FW, Govt. of India	Member
Joint Secretary (Health), MoH&FW, Govt. of India	Member
Director General of Health Services, MoH&FW, Govt. of India	Member
Animal Husbandry Commissioner, DAHD, MoFAH&D	Member
Director General, Indian Council of Medical Research	Member
Director General, Indian Council of Agriculture Research	Member
Director General, Remount Veterinary Services	Member
Chairman, Animal Welfare Board of India	Member
Joint Secretary (Livestock Health), DAHD, MoFAH&D	Member
Joint Secretary of Ministry of Science and Technology, Govt. of India	Member
Joint Secretary of Ministry of Agriculture and Farmers Welfare, Govt. of India	Member
Joint Secretary of Ministry of Human Resources Development, Govt. of India	Member
Joint Secretary of Ministry of Information and Broadcasting, Govt. of India	Member
Joint Secretary of Ministry of Environment, Forest & Climate Change, Govt. of India	Member
Joint Secretary of Ministry of Housing and Urban Affairs, Govt. of India	Member
Joint Secretary of Ministry of Drinking Water & Sanitation, Govt. of India	Member
Secretary of National Human Rights Commission	Member
Joint Secretary of Ministry of Panchayati Raj, Govt. of India	Member
Chief Executive Officer, NITI Aayog	Member
National Program Officer of NRCP and Designated National Nodal officer at DAHD (MoFAHD)	Member secretary

## Annexure 2. Constitution of Joint Steering Committee at the State level

The State Action Plan for Rabies Elimination will be formalized by the Joint Steering Committee at the State Level.

### Term of reference:

The committee will be responsible for the monitoring of all the collaborative activities of the State Action Plan for Rabies Elimination (SAP-RE). The committee will monitor the uninterrupted supply of logistics required for the execution of the plan. The committee will also ensure and facilitate the integration, cooperation, collaboration and Communications required among stakeholders at all level for successful implementation of the SAP-RE with One Health Approach. The proposed constitution of the joint steering Committee at the State level is as under-

National Joint Steering Committee	
Chief Secretary, State Government	Chair
Secretary of State Public Health Dept	Co-chair
Secretary of State Animal Husbandry Dept	Co-chair
State NHM, Mission Director of State Public Health Dept	Member
Commissioner/Directorate of State Public Health Dept	Member
State Animal Husbandry Commissioner/Director of State Animal Husbandry Dept	Member
Secretary, State Animal Welfare Board of India	Member
Secretary of State Department of Environment, Forest & Climate Change	Member
Secretary of State Department of Housing and Urban Affairs,	Member
Secretary of State Department of Drinking Water & Sanitation	Member
Secretary of State Department of Panchayati Raj	Member
State Department of Environment, Forest & Climate Change	Member
Director of Department of Housing and Urban Affairs,	Member
Director of Department of Drinking Water & Sanitation	Member
Director of Department of Human Resources	Member
Director of Department of Panchayati Raj	Member
Director of Department of Information and Broadcasting,	Member
Representative of Civic Bodies involved in Rabies control	Member
Representatives of NGOs	Member
Vice Chancellor of University of Agriculture, Veterinary and Animal Sciences University	Member
Vice Chancellor of Health Sciences University	Member
Principal Chief Conservator of Forest (Head of Forest Force) or equivalent Officer	Member
State Nodal Officer of NRCP and designated Nodal veterinary officer at State DAHD	Member Secretary

### **Annexure 3. Constitution of Joint Steering Committee at the District Level**

Like the State Level Steering Committee, Districts Level Steering Committee will be formed in districts.

#### **Term of reference**

Districts Level Steering Committee will coordinate among stakeholders for the implementation of the plan at the district level. Districts Level Steering Committee will review and evaluate the progress at the district level. The constitution is as under:

<b>National Joint Steering Committee</b>	
Chief District Magistrate / Collector	Chair
Chief District Medical Officer/ Civil Surgeon	Co-Chair
Chief District Veterinary Officer/Deputy Director (AH)	Co-Chair
Representative Urban Local Governments (Municipality Corporations /Councils)	Member
Representative Rural Local Governments (Panchayati Raj Institutions)	Member
Representative faculty Medical and Veterinary College	Member
Representative NGO/ AWO	Member
District Forrest Officer/ Head of Forrest	Member
District Nodal Officer at NRCP and designated District Veterinary Officer at DAHD	Member Secretary

## Annexure 4. Source of funds proposed for NAPRE

The funds are available at various levels for undertaking the activities of human and animal health component. The successful execution of the Rabies elimination plan depends upon the judicious use of the available resources in an efficient manner keeping in view of the 'One Health Approach'. The proposed sources of funds for both the components are as under: -

S. No.	Human Health Component	
1	ARV -ARS	National Free Drug Initiative. State Revenue
2	Training	NRCP- NHM, State Budget
3	IEC	NRCP- NHM, State Budget
4	Laboratory	NRCP- NHM, State Budget
5	Operational research	NRCP, ICMR

S. No.	Animal Health Component	
1	Vaccination	ASCAD, RKVY, State animal husbandry funds, Local governing bodies- municipalities (urban), PRI (RURAL)
2	Training	ASCAD, PMSKY, State animal husbandry funds Local governing bodies- municipalities (urban), PRI (RURAL)
3	IEC	ASCAD, State animal husbandry funds, Local governing bodies- municipalities (urban), PRI (RURAL)
4	DPM	AWBI, Local governing bodies- municipalities (urban), PRI (RURAL), NGOs, Corporate Social Responsibility
5	Laboratories	ASCAD, State Animal Husbandry funds
6	Operational research	DAHD, ICAR



## **Annexure 5. Guidance notes for preventing a shortage of Rabies Vaccine, Human & Anti Rabies Serum/Immunoglobulin**

1. Manufacturing of Rabies Vaccine, Human is a complex biological process and require a minimum of 3-4 months for manufacture and testing. Accordingly, the States/ procurement agencies may be sensitized about the minimum lead time required for supply, and plan.
2. The annual requirement of Anti Rabies Vaccine & Anti Rabies serum must be calculated 4-6 months in advance. The requirement must include 10% Wastage factor and buffer stock for three months (As Lead time from order placement to actual delivery of vaccines). Accordingly, the tender/ purchase order needs to be placed in advance.
3. As per the Drugs and Cosmetics Rules, 1940, the batch of Rabies Vaccine, Human has to be released by the manufacturer after testing in the manufacturer's laboratory and after ensuring that the vaccine complies with the specifications. It is also mandatory, as per procedures defined, to submit the samples of Rabies Vaccine, Human along with protocols to Central Drugs Laboratory (CDL), Kasauli for evaluation and lot release before it is supplied in the country. Normally, testing of Rabies vaccine, Human takes approximately 3 to 4 weeks.
4. Tenders should be issued for fixed quantities rather than the rate contracts.
5. Rabies Vaccine, Human & Anti Rabies serum stock must be monitored on regular basis. Monitor the district/ institute-wise stock situation and accordingly, plan the supply based on consumption. If necessary, additional procurement order may be placed.
6. The States shall analyze the average time required for completing the tender process to the actual placement of the order and accordingly, the procurement procedures to be started well in advance to avoid shortage of Rabies Vaccine, Human & Anti Rabies serum supply.
7. The State Authorities need to be sensitized to analyze their annual requirement and the lead time required for completing all procedures well in advance, guard against shortages in the supply of Rabies Vaccine, Human & Anti Rabies serum.
8. Anti-Rabies vaccine and Anti Rabies serum are part of the essential drug list of the National Health Mission (NHM). Budget for Rabies Vaccine, Human & Anti Rabies serum may be proposed under NHM PIP under national free drug initiative.
9. As per national guidelines, the preferred route of administration for Rabies Vaccine, Human is Intradermal. It is cost-effective and requires 0.2 ml/ Visit/patient for intradermal route vs. 1 ml/visit/patient for intra muscular route).
10. In case of shortage of Rabies vaccine, Human, please inform to National Pharmaceutical Pricing Authority (NPPA), Department of Pharmaceuticals (DoP) or Ministry of Health and Family Welfare (MoHFW) for addressing the issue. Non-supply of Rabies vaccine, Human due to the pendency of bills should not be referred to DoP/MoHFW/CDSCO.

## Annexure 6. Standard Operating Procedure for Dog Population Estimation

The population estimate of free roaming dogs (FRD) in the intended area for conducting Mass canine vaccinations and even animal birth control (ABC) is essential to:

- To estimate the magnitude of resources required for interventions such as MDV. For e.g. number of vaccines required, dyes, identification marks, bikes, manpower etc.
- To Evaluate the efficacy of interventions and course correction for subsequent MDV campaigns.

### A. Methods for Dog Population Estimation

In the Indian context, the approach for estimating the canine population should be resource and time-efficient while simultaneously providing the most accurate estimate for meeting the target (at least 70% of dog population). Following methods are suggested for estimating the FRD population for vaccination: -

1. **Mark-Release-Recapture Methods** such as the name suggest, a sample of dogs captured, marked in a manner that does not affect the animal survival and then released back into the population. Allow the marked dogs to mix randomly through the total population and then the dogs are captured a second time. The number of recaptured dogs (i.e. marked dogs) to first-time captures in the second sample gives the Lincoln-Petersen estimate of total population size. This method can be planned in two ways: -
  - **Single-Sight (SS) Surveys-** AM survey is done involving 2 surveyors in each team, travelling on a 2-wheeler bike through all parts of an allocated zone and recording details of every dog they see. Both people keep a look out for dogs, one is responsible for driving and the other records details of the dogs sighted in the mobile phone App.
  - **Sight-Re sight (SRS) Surveys-** after conducting the SS survey, SRS is done to check the accuracy of SS This is done by conducting a survey again in the same region (1 or 2 days continuously) and then marking all dogs with a physical marker (such as dyes), or virtually (pictures of the dog through mobile app. All dogs seen on the second day are recorded irrespective of whether or not they were 'marked' as seen on the first day. A minimum of two surveys should be conducted and the details should be matched to ascertain the number of dogs seen once and those seen twice during the entire survey.
2. **Through using statistical software-** The population estimate with 95% Confidence Intervals can be obtained by using the Application Super Duplicates tool <https://chao.shinyapps.io/SuperDuplicates/><sup>20</sup> As per the review of literature currently available on dog enumeration, probabilistic models developed on capture-recapture technique is the most feasible method adapted for the Indian context which has provided the most accurate population estimation to actual dog population.
3. **Through using the local animal census database-** The canine census has been included in the 2012 livestock census. If enumeration of the dog population is not possible, the block-level census could be used for planning. However, this is not recommended method as this could lead to under vaccination and shortage of resource material in the selected area.
4. **By conducting local house to house questionnaire-** based surveys- to estimate the number of owned dogs. the mean number of owned dogs per household and dog: human ratios. Since the total human population or number of households is generally known through national population censuses, an estimate of the owned dog population can then be extrapolated<sup>21</sup>.

### A. Planning of Dog enumeration in An Identified area –

#### i. Before you begin -

- Identify the number of villages/wards/administrative units where the MDV is being planned.
- Map the boundaries, the internal streets/roads of the village/wards/administrative units.
- Draw Detailed Street map of the selected block to ensure that every street is covered.
- Make a list of owned and un-owned dogs in the local community which would be called as Community owned dogs. All dogs that conform the definition of free roaming dogs must be included in the survey.

## ii. Identify & train the survey team-

- The survey teams should carry writing materials, GPS or any other handheld device or mobile with GPS and camera.
- An attempt should be made that the composition of the teams and the pre-determined routes followed by the team must remain the same in all the subsequent surveys.
- The teams should record the GPS waypoints, take photographs of the animal, and record the various characteristics of the encountered dog. Care should be taken not to disturb the natural behavior of dogs by not driving too close to the animals while still maintaining their pre-set route.
- A minimum of two surveys should be conducted and the details should be matched to ascertain number of dogs seen once and those seen twice during the entire survey.

## iii. Calculate the dog population through statistical extrapolation.

- USING SOFTWARE-Once the survey team has completed their rounds, the population estimate can be obtained by using the Application Super Duplicates tool( <https://chao.shinyapps.io/SuperDuplicates/>). The values observed must be directly added to the online app.

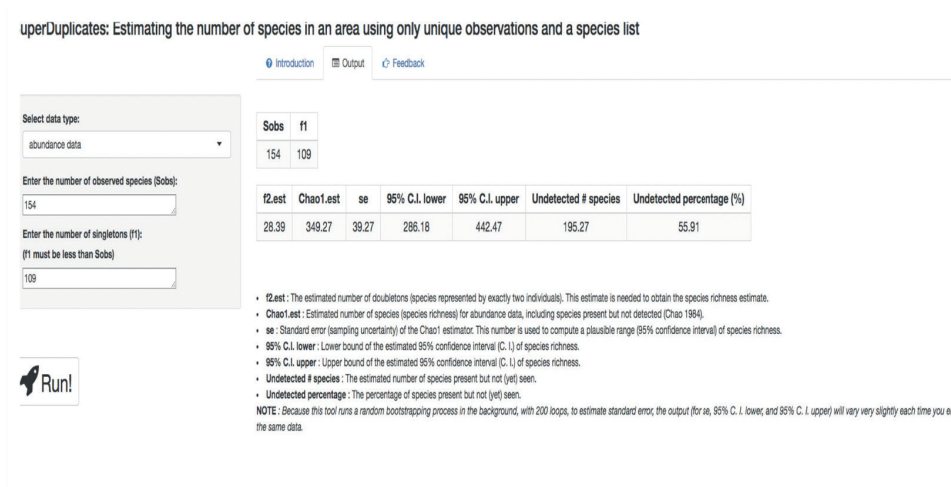


Figure 17 User Interface for the Application Super Duplicates (AS)

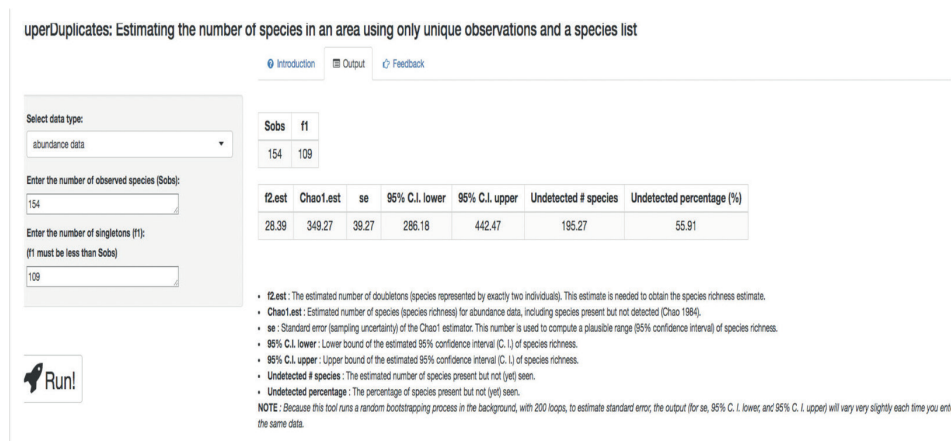


Figure 18 Super duplicates used for estimating the number of species in an area

- Using formula for Population estimate  
(Lincoln – Petersen method)

Estimate of population size

$$= \frac{(\text{Number of animals marked and released} \times \text{Number of animals captured in second survey,})}{(\text{Number of marked animals recaptured in second survey})}$$

c. Population estimate

$$= \frac{(\text{Total number of dogs counted in the sample blocks} \times \text{Total number of blocks})}{(\text{Number of sample blocks where dog enumeration is done})}$$

- To calculate the Density of stray dog in the Block

$$\text{Density of stray dog in the Block} = \frac{(\text{Number of free roaming Dogs})}{(\text{Area of the Block})}$$

Once the dog population is estimated, target population for intervention should be identified and planning should be done for operational requirement for implementing mass dog vaccination program in the identified areas. (Number of free roaming Dogs)

## Annexure 7. Standard Operating Procedure for Mass Dog Rabies Vaccination Campaign

### A. Planning of Mass Dog Rabies Vaccination Campaign

A meeting with stakeholders (AHD, Health, LGB, NGO, Rabies Committee) must be set to discuss the: -

1. Strategies on how to cover most of the population.
2. Logistics includes the source of vaccines, human resources and their identification, how to inform the community about the activity, where to get the dog population list and the activities on the vaccination day proper.

### B. Orientation of the vaccination teams & plan of action during MDV

3. The vaccination teams should be divided into groups and briefed on the schedule for the day, location, and the selected route.
4. The local official could accompany them so that no areas are left un-covered.
5. The team should be equipped with enough ARV while maintaining a cold chain to undertake MDV.
6. Registration and permanent identification of all vaccinated dogs should be done with the issuance of a card for pet animals and with owners.
7. In the case of free-roaming/stray dog vaccination, dog handlers could be used to catch and restrain dogs humanely as per the ABC rule and be vaccinated.
8. The use of a color spray of all vaccinated dogs as temporary marking could be done for the stray/community owned dogs.
9. A survey should be undertaken soon after the completion of the MDV (within 3 days) of the campaign to assess the numbers of marked and unmarked dogs.

### C. Training of vaccinators, vaccine handlers, and dog catchers

10. Only trained volunteers should be involved in MDV. The volunteer should be trained on proper vaccination techniques and humane dog catching. vaccine handlers must be trained on the proper handling, storage of vaccines, disposal of used materials and vaccine utilization reporting.
11. All volunteers involved in MDV campaigns should complete the vaccination against Rabies through pre-exposure prophylaxis as they are considered high-risk personnel.

### D. Selection of Vaccination strategy

Four basic methods have been described below for conducting mass dog vaccination programme\*:

12. **House-to-house visits-** field Mobile teams visit individual houses and vaccinate the pet animals.
13. **Hospital/ clinic visits-** Dog owners take their dogs/cats at any time to private or government veterinary clinics.
14. **Vaccination camps-** Temporary vaccination posts can be set up at a central location within villages or cities which are convenient and commonly used by the community members.
15. **Capture/vaccinate/release campaigns-** In case the program is merged with the sterilization program.
  - **Mobile street vaccination plans-** For pet dogs, community dogs & FRDs where vehicles would be used for gauging the areas and setting the base for vaccination.
  - **A combined approach of all the above methods-** e.g., house-to-house vaccination can be combined with vaccination camp and mobile street vaccination plan.

*\*Administration of Rabies vaccine can be linked with other health interventions (e.g. deworming, neutering and other vaccination programmes), which might provide additional health benefits for the dog and provide an incentive for engagement of both owners and veterinary practitioners in vaccination campaigns*

## E. Identification mark for the vaccinated dog

All dogs which are vaccinated must be visually marked to identify the animals which are vaccinated and not vaccinated. Various techniques can be used to provide identification marks (temporary or permanent) such as the use of colored tags, paint or spray marks, or plastic collars as temporary marking has proven to be useful in identifying vaccinated dogs.

*(Local governing bodies of Mumbai and New Delhi have already made pet registration compulsory in their wards. In such cases and for pet dogs, Registration and permanent identification of vaccinated dogs should be done and owner must be provided with Animal Health Booklet which will have the updated vaccination record.)*

## F. Recording

A vaccination form must be filled up during vaccination and must be collected after each vaccination drive. A certificate of vaccination must be accomplished and given to the dog owner as proof of vaccination.

## G. Communication strategy for MDV camps

A successful campaign should involve an intensive communication strategy about the Date, time of vaccinations. A detailed vaccination schedule of the place to be visited by the teams should be prepared in advance and distributed to all the concerned in-charges who in turn informed the public so that they can bring in their pets and community dogs to the designated areas. Mass community engagement campaigns must be done before the beginning of MDV.

## H. Duration of the vaccination program

The prescribed duration for vaccination in a village or ward must be 1-3 days depending on the land area and population density. However, the entire selected area should be covered such that 70 percent of dogs are vaccinated in the shortest period for the vaccination strategy to be effective.

### i. Facilities required for Mass dog vaccination and post-vaccination survey

#### 1. Manpower-

- State Program Management unit
- Project Manager
- Veterinarians
- Dog Catchers
- Support Staff for Logistics
- Trained AI technicians
- Post-vaccination survey staff
- Laboratory staff

#### 2. Vaccine - Anti-Rabies vaccine in the cold chain-maintained environment

#### 3. Logistics

- Communication devices
- Dog Catching equipment's- capturing nets, capturing pole, etc.
- Camera for digital records
- GPS Device
- Dog Registration card
- Needle and syringe (18 gauze, 10 ml)
- Hand gloves
- Disinfectant
- Cool box with an ice pack
- Vaccine and vaccine carriers
- Marker pen (permanent)
- Cotton/tissue paper
- Sample label
- Relevant registers and Forms
- Dyes/Identification tools
- Ethanol 70

#### 4. Diagnostics - ELISA kits for antibody titration, Laboratory testing- courier charges/fees.

#### 5. Vehicle

- Staff transport & goods
- Vehicle for Field Team
- Post vaccination survey motorcycle
- Rent/Fuel allowance

## Annexure 8. Standard Operating Procedure for Assessment of Post Dog Vaccination Coverage

### A. Assessing the mass dog vaccination coverage

To estimate the number of dogs (pet dogs, community owned dogs and street dogs) vaccinated in the MDV to and for differentiation between vaccinated & unvaccinated dogs. The mass vaccination aims at the method most apt for estimation should be done as per the local requirement. Vaccination coverage estimation can be done as per the local requirement using the following method<sup>22</sup>:-

#### i. Direct observation of marked and unmarked dogs-

Identification of colored marked collar or ear notching of Vaccinated dogs shortly after the MDV is concluded This should be done immediately (within a week) after the completion of the vaccination campaign. A good technique for observing vaccination among the free-roaming dog population.

#### ii. Surveys for pet dog's post-vaccination

Dog owners could be asked to produce vaccination certificates to identify dogs vaccinated in the ongoing vaccination campaigns in the case of pet animals.

*(Note- The duration of temporary marks on the animal should be considered when planning an evaluation as Collars may be lost or removed and paint marks may wash off after several days. Restricted / household vaccinated dogs that are kept inside the house or backyard are often not observed)*

#### iii. Calculation of doses of vaccine used in comparison with the estimated dog population

**However**, the level of vaccination coverage calculated using this data is generally overestimated.

*Formula for calculation of minimum Number of animal rabies vaccine required = Dog Population X  
0.07 \* Coverage X 0.1 Vial / Dog.*

*For eg = Dog population estimated in an area as 10,000,00 X 0.07 = 70,000 dogs need to be  
vaccinated to achieve herd immunity*

*1 vial = vaccinates 10 dogs.*

*Hence to vaccinate 70,000 dogs, = 70,000 x 0.1 = 7000 vials would be required  
(\*70 % vaccination coverage)*

#### iv. Sero surveillance-

To be conducted regularly to determine sero-conversion post mass dog vaccination as per the prescribed guidelines to monitor the dog vaccination activities. Reporting format for Mass dog vaccinations by the Block, district and state level are at **Annexure 9**.

*A revaccination campaign should be organized if the vaccination coverage is found to be below 70% of the estimated dog population.*



## Annexure 9. Monthly Reporting format for Vaccination Coverage & Canine Rabies

### A. Monthly Reporting format for vaccination coverage State /District/Block

(The details of animals vaccinated in the field should be reported using the Monthly Animal Health Report Form (annexure) and then enter the data in the NAPRE portal by the Veterinary and local governing body sector.)

1. State/District/block
2. Village

State /district/ Block/ village name	No. of dogs in state (as per census, or as per local dog enumeration)	No. of dogs vaccinated in MDV	No. of dogs vaccinated routinely	% Coverage (Total vaccinated / Total dog population)	Remarks

3. Reporting Animal Health Centre, No: \_\_\_\_\_

*For the nil report, the form may be crossed with 'NIL' written across the form.*

(Signature of State/District/Block Officer)

### B. Monthly reporting form for Canine Rabies for State /District/Block

(Animal Husbandry Department to State health department and National program management unit animal and human health)

1. State/District/Block
2. No of Districts:

State /district/ Block/ village name	No. of dogs in state (as per census, or as per local dog enumeration)	No. of Suspected* Rabies in dogs	No. of Lab confirmed Rabies in dogs	Remarks

(\*Animal Rabies Should include both confirmed by laboratory and diagnosed on clinical grounds)

*For the nil report, the form may be crossed with 'NIL' written across the form.*

(Signature of District Officer)

## Annexure 10. Reporting Format for Model Anti Rabies Clinic

Date: _____ District: _____ Block: _____ Address: _____	Name & Designation of ARC Nodal officer: _____ _____ Contact No.: _____ ARC Facility Coding) _____ Month: _____ Year: _____
--	--

Component	Indicator	Mark as Required		
		Total No. of post sanctioned/ No. of post filled	Trained (Yes/No)	If yes- provide date of the training
<b>Human Resource (trained in Animal Bite management and Rabies Pre and Post Exposure prophylaxis)</b>	<b>Manpower</b>			
	Physician (Trained)			
	Nurse (GNM) (Trained)			
	Pharmacist (Trained)			
	Others			
<b>Physical Infrastructure</b>	Visible sign boards at the entrance of the center as well as outside the center	Yes/No		
	Visible organizational Chart	Yes/No		
	Time schedule (functional hrs. of ARC)			
	Visible flow chart/algorithm of "decision to treat"	Yes/No		
	Visible IEC messages	Yes/No		
	Separate Wound washing facility with preferably continuous tap water	Yes/No		
	Facility for proper Biomedical waste management with availability of Color-			
	coded waste bins and sharp boxes	Yes/No		

Component	Indicator	Mark as Required
<b>Logistics</b>	National Guidelines for Rabies Prophylaxis 2019	Available / Not Available
	Dressing Kits	Available / Not Available
	self-mounted insulin syringes (AD)	Available / Not Available
	Weighing Scaler	Available / Not Available
	Soap and Gloves	Available / Not Available
	IV Fluids and Emergency drugs for adverse reaction	Available / Not Available
	Autoclave	Available / Not Available
	Vaccine carrier	Available / Not Available
	Refrigerator with a calibrated thermometer	Available / Not Available
	Collection of Blood samples and referral services for hydrophobia cases and titre estimation	Yes/No
	Standardized recording and reporting systems	Yes/No
<b>Services Rendered and Availability of Reporting formats (Online/ Offline)</b>	Anti-Rabies Vaccine (ARV)	Yes/No
	Rabies Immunoglobulin / Anti Rabies Serum- Human (ARS)	Yes/No
	Animal bite exposure register	Yes/No
	Rabies vaccination card / rabies treatment card in duplicate	Yes/No
	Line List format of Suspected / Probable /case of Rabies	Yes / No
	Human rabies / hydrophobia cases monthly format from Infectious Disease Hospital /any other hospitals	Yes / No
	Monthly reporting format of animal bites	Yes / No
Rabies Awareness/ Education activity	Camps organized in villages	Yes / No
	Health education sessions in villages	No of sessions
		Population Covered
	Health education sessions in schools	No of sessions
		No of Children covered
Any other Activity Conducted/ Intended to conduct		

## Annexure 11. List of existing Laboratories for diagnosis of Human Rabies

S.No	Name	Contact Details	Address
1	National Institute of Medical Health and Neuro Science, Bangalore, Karnataka	+ 91-080-26995201, 26995202 virologynimhans@gmail.com	Hosur Rd, near Bangalore Milk Dairy, Lakkasandra, Laljinagar, Wilson Garden, Bengaluru, Karnataka 560029
2	Rabies Research Centre Central Research Institute Kasauli	01792-272040 Director-crik-hp@gov.in	Kasauli, Himachal Pradesh 173204
3	Centre for Arboviral and Zoonotic Diseases National Central for Disease Control, Delhi	+91-11-23971272, 23971060 nicdzoosis@yahoo.com	22, Sham Nath Marg, Civil Lines, New Delhi, Delhi 110054
4	Infectious Disease and Beliaghata General Hospital, Kolkata, Govt. of WB	+91- 033 2353 6071 /2371/0033 hospitalidbg@gmail.com	57, Belegkata Main Rd, Subhas Sarobar Park, Phool Bagan, Belegkata, Kolkata, West Bengal 700010
5	Viral Research and Diagnostic Laboratory, Govt medical College, Amritsar, Govt. of Punjab	+91-183 242 6918 vrldamritsar@gmail.com	Medical Enclave, Amritsar, Punjab 143001
6	Regional Institute of Medical Science, Imphal, Manipur	+91-385 241 4629 ranjanakhu@rediffmail.com	Lampfel Rd, Lamphelpat, Imphal, Manipur 795004
7	State Public Health and Clinical Laboratory, Trivandrum, Govt. of Kerala	+91-11-23978046 phlabtvp@gmail.com	Red Cross Road, near General Hospital Road, Rishimangalam, Pattoor, Thiruvananthapuram, Kerala 695024
8	Rangaraya Medical College, Kakinada, Govt of Andhra Pradesh	+91-884 236 3401 principal_rmc@yahoo.com	Pithampuram, Road, Kakinada, Andhra Pradesh 533001
9	Haffkine Institute for Training, Research & Testing, Mumbai, Maharashtra	+9122-24160947 ,24160961 ,24160962 virology@haffkineinstitute.org	40/W, Acharya Dhonde Marg, Parel Village, Parel, Mumbai, Maharashtra 400012
10	AIIMS, jodhpur, Rajasthan	+91-87645 05002 spkombade@gmail.com	basni Industrial Area, MIA 2nd Phase, Basni, Jodhpur, Rajasthan 342005

## Annexure 12. List of existing Laboratories for diagnosis of Animal Rabies

S.No	Name	Contact Details	Address
1	Veterinary College, Hebbal, Karnataka Veterinary and Animal Sciences University.	09449992287, kisloor@gmail.com	Hebbal, Bengaluru-560024, Karnataka
2	Institute of Animal Health and Veterinary Biologicals	080 2341 1502, diriahvb@gmail.com	Bellary Rd, Bengaluru, Karnataka 560024
3	ICAR - National Institute of Veterinary Epidemiology and Disease Informatics	080 2309 3110, director.nivedi@icar.gov.in	Ramagondanahalli, Post Box No. 6450, Yelahanka, Bengaluru, Karnataka 560064
4	Tamil Nadu Veterinary and Animal Sciences University	9940534047, tirumurugaan.k.g@tanuvas.ac.in	Madras Veterinary College Campus Chennai- 600 007, Tamil Nadu
5	State Institute for Animal Diseases (Department of Animal Husbandry, Kerala)	9446557186, swapnasusan2003@yahoo.co.in	Pacha P.O., Palode, Thiruvananthapuram-695 562, Kerala
6	College of Veterinary and Animal Sciences, Kerala Veterinary and Animal Sciences University, Mannuthy	9447668796, vinodkumar@kvasu.ac.in	Mannuthy, Thrissur, 680651 Kerala
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8	Scientific and Technical Manager Mission Rabies Office	9972449007, gowri@missionRabies.com	Flat# B-C2, Veterinary Hospital Complex, Tonca, Miramar, Panaji, Goa 403002
9	Bombay Veterinary College, Maharashtra Veterinary and Animal Sciences University.	9167493932, rpharande@gmail.com	Parel, Mumbai-400012 Maharashtra
10	College of Veterinary Science & A. H. Anand Agricultural University	9228309371, bbbhanderi@aau.in	Anand -388 110, Gujarat
11	Guru Anga Dev Veterinary and Animal Sciences University	9888466676, cksingh@usa.net	Ludhiana, Punjab – 141002
12	ICAR- Indian Veterinary Research Institute (IVRI)	9897806926, karam.singh@rediffmail.com	Izzatnagar – 243122, Bareilly, UP
13	College of Veterinary Science Assam Agricultural University	94355-58695, duttajyotib@gmail.com	Khanapara campus, Guwahati - 781 022, ASSAM
14	Disease Diagnostic Unit, Dept. of Animal Husbandry, State Govt. of Goa	+91-832 243 7245	Pashusamvardhan Bhavan, MG Rd, patto, Panaji, Goa 403001
15	Centre for Arboviral and Zoonotic Diseases National Central for Disease Control, Delhi	+91-11-23971272, 23971060 nicdzoosis@yahoo.com	222, Sham Nath Marg, Civil Lines, New Delhi, Delhi 110054



## Diagnostic Laboratories in India for Human and Animal Rabies

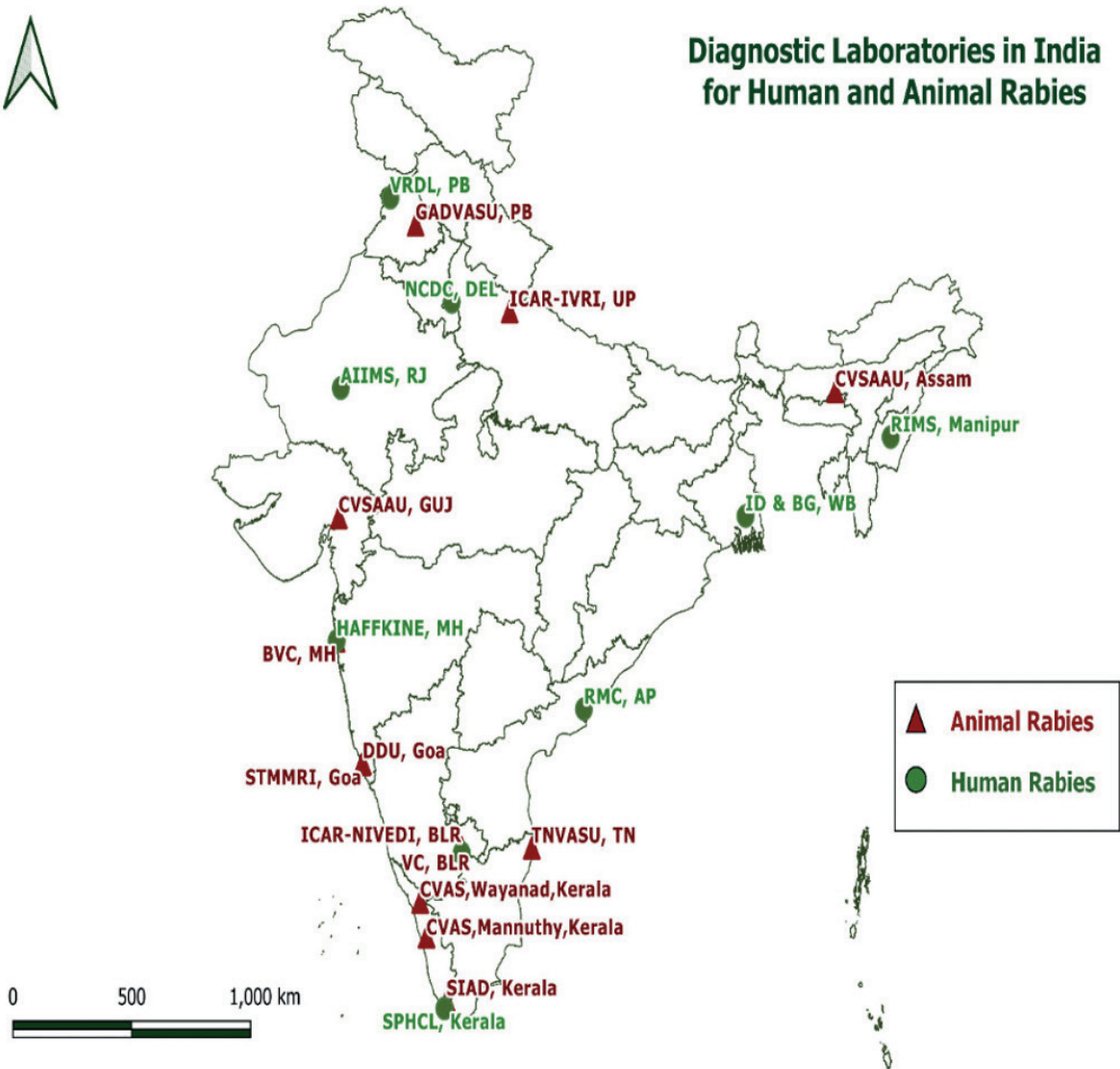


Figure 19 List of existing Laboratories for diagnosis of Human and animal Rabies

### Annexure 13. Activity matrix and Road Map for Zero Rabies Deaths – Human Health component

Ministry of Health and Family Welfare is already undertaking the activities (as described under the activity matrix) as part of National Rabies Control Programme since 12th five year plan i.e., year 2012. However, for benefit of state-level stakeholders, the roadmap to achieve target of “Zero Death due to Rabies” is described in phase wise manner as under-

Phase	Phase 1 (5 YEARS)	Phase 2 (9 YEARS)	Phase 3 (3 YEARS)	Phase 4 (3 YEARS)
Action points	<ul style="list-style-type: none"> <li>• Advocacy and creating awareness.</li> <li>• Form a national task force on Rabies.</li> <li>• Establish National Case definition for Human Rabies.</li> <li>• Publish guidelines on National Rabies programme and develop a strategy towards short and long-term plans.</li> <li>• Develop Legal Framework for the programme (Acts) and to make human Rabies notifiable.</li> <li>• Identify or establish funding (eg schemes, program) components under funding (such as vaccines, training, IEC etc).</li> <li>• Initiate capacity building, Professional education and training of medical officers and field staff.</li> <li>• States implementing ID Route for Rabies PEP in major health facilities.</li> <li>• Achieve Intersectoral collaboration by sharing information with civic bodies and Animal Health department.</li> <li>• Initiate Human Rabies cases/death Surveillance, animal bite cases and PEP</li> <li>• Develop the existing medical infrastructure.</li> <li>• Ensure Adequate supply of ARV vaccines and ARS Serum in accordance with WHO standards.</li> <li>• Develop joint Outbreak response teams and other Rabies control activities in areas identified as high-risk areas.</li> <li>• Start aggressive campaigns for Post exposure prophylaxis, PEP in High-risk groups, and vaccination in dogs.</li> <li>• Develop Laboratory capacity for testing and coordinate with WHO referral laboratory.</li> </ul>	<ul style="list-style-type: none"> <li>• Advocacy and creating awareness.</li> <li>• Strengthen surveillance systems, including feedback mechanisms, functioning and coordination between administrative levels (national, state, district, municipal, etc.) for Rabies cases/deaths.</li> <li>• Scale up implementation of the programme throughout the country.</li> <li>• Strengthening Laboratory capacity and testing</li> </ul>	<ul style="list-style-type: none"> <li>• Advocacy and creating awareness.</li> <li>• Declare Rabies free zones (villages/blocks/districts)</li> <li>• Continue Surveillance activity</li> <li>• Conduct joint field investigations in case of Human Rabies cases</li> <li>• All States implementing ID Route for Rabies PEP in major health facilities</li> <li>• Characterization and analysis of circulating Rabies virus variants by a national or international laboratory.</li> <li>• Declare Rabies free zones(villages/blocks/districts)</li> </ul>	<ul style="list-style-type: none"> <li>• Declare country freedom status to OIE</li> <li>• Declare country freedom status to WHO</li> <li>• Advocacy and creating awareness</li> <li>• Verify freedom from Rabies.</li> </ul>



## Annexure 14. Activity matrix and Road Map for Zero Rabies Death – Animal Health component

The activity of animal components such as canine vaccination and dog population management are fragmented across various sectors such as activities undertaken by ASCAD schemes, ABC activity undertaken by municipal cooperation's, animal welfare organizations. However, to achieve "Rabies: Zero", targets the following road map describes the activities in a phase-wise manner as under-

Phase	To achieve vaccination status of at least 70 % of the canine population Phase 1 (3 YEARS) Preparatory phase	To achieve vaccination status of 70 % canine population Phase 2 (5 YEARS) Scale up dog vaccination	Maintain vaccination status of 70 % canine population Phase 3 (3 YEARS) Maintain dog vaccination status	Maintain vaccination status of 70 % canine population Phase 4 (3 YEARS) Maintain dog vaccination status & canine surveillance
Action points	<ul style="list-style-type: none"> <li>i. Advocacy and creating awareness</li> <li>ii. Form a National task force on Rabies.</li> <li>iii. Establish National Case definition for Dog Rabies</li> <li>iv. Publish guidelines on National dog Rabies programme and develop a strategy towards short terms plans and long-term plans.</li> <li>v. Develop Legal Framework for the programme (Acts) and to make animal Rabies notifiable</li> <li>vi. Identify or establish funding (eg schemes, program), components under funding (such as vaccines, training, IEC etc).</li> <li>vii. Initiate capacity building, professional education and training of field staff</li> <li>viii. Achieve Intersectoral collaboration by sharing information with civic bodies and the Health Department.</li> <li>ix. Initiate canine Surveillance and population count and identify community owned dogs and pet dogs</li> <li>x. Develop the existing veterinary infrastructure (e.g. kennels in government clinics,).</li> <li>xi. Ensure Adequate supply of dog vaccines in accordance with OIE standards</li> <li>xii. Develop joint Outbreak response teams and other Rabies control activities in areas identified as high risk areas.</li> <li>xiii. Start aggressive campaigns for vaccination of dogs and responsible dog ownership campaign.</li> <li>xiv. Start a pilot project in selected city or state for implementation of program which would include KAP surveys.</li> <li>xv. Develop Laboratory capacity for testing and coordinate with OIE referral laboratory and Central lab</li> </ul>	<ul style="list-style-type: none"> <li>i. Advocacy and creating awareness</li> <li>ii. The results of a pilot project in a selected city or state with improvements should now be implemented throughout the country.</li> <li>iii. Establish surveillance systems, including feedback mechanisms, functioning and coordinated between administrative levels (national, state, district, municipal, etc.)</li> <li>iv. Initiate implementation of the programme throughout the country</li> <li>v. evaluate vaccination coverage in canines</li> <li>vi. Continue Surveillance activity and canine population count</li> <li>vii. Implementation of dog population management</li> <li>viii. Strengthening Laboratory capacity and testing</li> <li>ix. Declare Rabies free zones (villages/blocks/districts)</li> </ul>	<ul style="list-style-type: none"> <li>i. Advocacy and creating awareness.</li> <li>ii. Declare Rabies free zones (villages/ blocks/districts)</li> <li>iii. Continue Surveillance activity and canine population count.</li> <li>iv. Implementation of DPM in all districts/states</li> <li>v. Upgrade surveillance from canine to other animals</li> <li>vi. Conduct joint field investigations in case of Human Rabies cases</li> <li>vii. Characterization and analysis of circulating Rabies virus variants by a national or international laboratory</li> </ul>	<ul style="list-style-type: none"> <li>i. Declare country freedom status to OIE</li> <li>ii. Declare country freedom status to WHO</li> <li>iii. Advocacy and creating awareness</li> <li>iv. Verify freedom from Rabies. Maintain dog population management in all states</li> </ul>

# REFERENCES

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1. Rabid by Bill Wasik, Monica Murphy: 9780143123576 | PenguinRandomHouse.com: Books. PenguinRandomhouse.com. Accessed January 19, 2021. <https://www.penguinrandomhouse.com/books/308182/rabid-by-bill-wasik-and-monica-murphy/>
2. Radhakrishnan S, Vanak AT, Nouvellet P, Donnelly CA. Rabies as a Public Health Concern in India-A Historical Perspective. *Trop Med Infect Dis*. 2020;5(4). doi:10.3390/tropicalmed5040162
3. Rose G, Barker DJ. What is epidemiology? *Br Med J*. 1978;2(6140):803-804. doi:10.1136/bmj.2.6140.803
4. WHO | Epidemiology and burden of disease. WHO. Published 2020. Accessed January 14, 2021. <http://www.who.int/rabies/epidemiology/en/>
5. Gongal G, Wright AE. Human Rabies in the WHO Southeast Asia Region: Forward Steps for Elimination. *Adv Prev Med*. 2011;2011:383870. doi:10.4061/2011/383870
6. WHO Expert Consultation on Rabies, Weltgesundheitsorganisation, eds. WHO Expert Consultation on Rabies: Third Report, Bangkok, Thailand on 26-28 April 2017. WHO; 2018.
7. Encyclopedia of Microbiology | ScienceDirect. Accessed September 2, 2021. <https://www.sciencedirect.com/referencework/9780123739445/encyclopedia-of-microbiology>
8. Anna Rovid Spickler. Rabies. Published online 2012. <http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.php>.
9. Reddy GBM, Singh R, Singh KP, et al. Molecular epidemiological analysis of wild animal rabies isolates from India. *Vet World*. 2019;12(3):352-357. doi:10.14202/vetworld.2019.352-357
10. Madhusudana SN, Mani R, Ashwin YB, Desai A. Rabid fox bites and human rabies in a village community in southern India: epidemiological and laboratory investigations, management and follow-up. *Vector Borne Zoonotic Dis*. 2013;13(5):324-329. doi:10.1089/vbz.2012.1146
11. N Veeraraghavan. A case of hydrophobia following bat bite. Published online 1954.
12. Childs JE, Colby L, Krebs JW, et al. Surveillance and spatiotemporal associations of rabies in rodents and lagomorphs in the United States, 1985-1994. *J Wildl Dis*. 1997;33(1):20-27. doi:10.7589/0090-3558-33.1.20
13. Fitzpatrick JL, Dyer JL, Blanton JD, Kuzmin IV, Rupprecht CE. Rabies in rodents and lagomorphs in the United States, 1995–2010. *J Am Vet Med Assoc*. 2014;245(3):333-337. doi:10.2460/javma.245.3.333
14. THE PREVENTION AND CONTROL OF INFECTIOUS AND CONTAGIOUS DISEASES IN ANIMALS ACT, 2009. <https://legislative.gov.in/actsofparliamentfromtheyear/prevention-and-control-infectious-and-contagious-diseases-animals-act>
15. The Delhi Municipal Corporation Act, 1957.
16. Government of India. The Epidemic Diseases Act, 1897. Published online 1897.
17. Government of India. The Public Liability Insurance Act, 1991. Published online 1991.
18. Central Pollution Control Board Guidelines. guidelines for carcass disposal. Published online 2020.
19. Section 393, Disposal of Dead Animals., Indian Penal Code., [https://www.indiacode.nic.in/show-data?actid=AC\\_CEN\\_5\\_5\\_00028\\_195766\\_1517807321857&sectionId=31310&sectionno=393&orderno=421](https://www.indiacode.nic.in/show-data?actid=AC_CEN_5_5_00028_195766_1517807321857&sectionId=31310&sectionno=393&orderno=421)
20. Chao A, Colwell RK, Chiu C-H, Townsend D. Seen once or more than once: applying Good–Turing theory to estimate species richness using only unique observations and a species list. *Methods in Ecology and*

Evolution. 2017;8(10):1221-1232. doi:<https://doi.org/10.1111/2041-210X.12768>

21. What techniques are available to estimate the number of dogs? - [caninerabiesblueprint.org](https://caninerabiesblueprint.org). Accessed May 25, 2021. <https://caninerabiesblueprint.org/5-4-1-What-techniques-are>
22. How can the level of vaccination coverage achieved be estimated? - [caninerabiesblueprint.org](https://caninerabiesblueprint.org). Accessed February 5, 2021. <https://caninerabiesblueprint.org/5-4-13-How-can-the-level-of>

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*Note*

*National Action Plan for Dog mediated Rabies Elimination from India by 2030 is a guidance document for States, UTs & stakeholders to develop their action plan as per need assessment. The Standard Operating Procedures for the activities envisaged are based on existing evidence & best practices. With evolving evidence, the SOPs and technical guidelines will be revised from time to time. For any comments and views, you can email us at : [napreindia@gmail.com](mailto:napreindia@gmail.com)*

## RABIES IS 100 PERCENT FATAL BUT PREVENTABLE



Rabies can be caused by bite or scratch of rabid animal such as dogs, cats etc



Do not apply chillies, mustard oil or any other irritant on the bite wounds



Wash the wound immediately with plenty of soap & water



Do not apply dressing & Do not get the wound stitched



Consult your doctor immediately or rush to nearest antirabies clinic



Complete the course of antirabies vaccination, as advised by your doctor



In severe bites, combined antirabies serum and vaccine therapy is recommended



Vaccinate your pets against rabies every year



[www.mohfw.nic.in](http://www.mohfw.nic.in)  
[www.mygov.in](http://www.mygov.in)  
[www.pmindia.gov.in](http://www.pmindia.gov.in)

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# National Rabies Control Program

Adopt One Health, Stop Rabies